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Muſeum Ruſticum et Commerciale:

OR,

SELECT PAPERS

ON

AGRICULTURE, COMMERCE, ‖ ARTS, AND MANUFACTURES.

DRAWN FROM EXPERIENCE,

AND

Communicated by GENTLEMEN engaged in theſe Purſuits.

Reviſed and Digeſted by ſeveral MEMBERS of the SOCIETY for the Encouragement of ARTS, MANUFACTURES, and COMMERCE.

VOLUME THE SIXTH.

Hæ tibi erunt Artes.

LONDON:

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Muſeum Ruſticum, &c.

For JANUARY, 1766.

VOLUME the SIXTH.

NUMBER I.

Continuation * *of the Account of the Culture of the Teaſel; in a Letter to the Editors of the* Muſeum Ruſticum, *from* Ruricola Gloceſtris.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN my laſt, the teaſel heads were left depoſited in a dry houſe, to acquire, from the gradual moiſture of the air in the place, an additional elaſticity to the hooks, and brighten in colour, 'till after Chriſtmas; the time that generally the heads are ſorted, and made out in the following manner. The handfuls are brought from the ſtore-houſe into ſome large room, uſually a barn-floor, where they

* The former part of this very ſenſible, and explicit account of the culture of the teaſel, is to be found in No. 57. p. 237. of Vol. III. The uſe of the teaſel is confined to the dreſſing-cloth; for which purpoſe, it is uſed inſtead of inſtruments made of wire; and is ſo preferable to wire, that a clauſe was inſerted in an act

they are untied one at a time; and generally made four ſorts of. The largeſt heads which are ſound, and are ſuch as grow on the middle ſtem of each branch, are thrown for the firſt ſort, and called *kings*. The next ſmalleſt which are ſound, and are commonly ſuch as grow as ſide heads on each branch, are thrown for a ſecond ſort, and are called *middlings*. Another, or third ſort, are ſuch of the largeſt, or thoſe which grew on the middlle ſtem, as are damaged by the mildew, wet, or other accident; and which would have been kings, had not ſuch defect rendered them unworthy that appellation. Theſe therefore are thrown to a third ſort, and denominated *ſcrubs*. The laſt, or fourth ſort, is the refuſe of all, and are ſuch as are too ſmall, or too much damaged for any uſe; and are therefore thrown away.

When a quantity is thus ſeparated, they are made out in the following manner: the perſons who do it, put off the kings ten in each handful. Firſt, ſix of the larger, in the manner of a fan extended: and four leſſer of the ſame ſort, in the boſoms of the ſix; and then bind their ſtems together with a ſpleet of willow, or ſome tough wood, by wrapping it about them three or four times, and tucking the end under. When the kings are tied up in handfuls in this manner, a ſtraight ſtick of about three-fourths of an inch diameter, and two feet ſix inches long, is ſplit to

of parliament, to oblige the manufacturers of cloth to uſe the teaſels only, under conſiderable penalties. The conſumption, therefore, of teaſels, is limited in proportion to the manufacture of cloth: but as one part of this kingdom has been ſupplied with them from another at a great diſtance, which conſequently inhances the price, and perhaps renders it difficult to procure the beſt kinds at all times, it ſeems a matter of ſome importance to have the perfect knowledge of the beſt manner of the culture of them rendered general. Since, as they may be produced with nearly the ſame advantage every where, we muſt aſcribe the neglect of cultivating them in the neighbourhood of places where they are moſt wanted, to an ignorance of the right means of doing it. The public, as well as ourſelves, are, therefore, greatly obliged to our correſpondent, who ſtiles himſelf *Ruricola Gloceſtris*, for this communication, as we believe, he is doing an eſſential ſervice to his country, by contributing to promote the cheapneſs or goodneſs of our woollen manufactures. R.

within

within four inches of one end. Twenty-five of theſe handfuls are put on this ſtick, alternately head to ſtem; letting two of the middle ſtems of each handful be in the cleft, to hold them ſecure: then a ſmall wreath, made of ſpleet, is ſlipped on the upper end of the ſtaff, which holds it together, and keeps the whole from falling about. In like manner are the ſcrubs, or third ſort, alſo made out and put in ſtaves. But of the middlings, or ſecond ſort, double the number of heads are put in one handful, by making two fan-like rows of ſix each, and four in their boſoms on each ſide; and theſe are put into ſtaves of three feet long each, ſpilt as the former, and thirty handfuls in each ſtaff. When they are thus made out, they are fit for ſale, and are to be laid by for that purpoſe in ſome convenient place, where they may not be bruiſed. Thirty ſtaves of the firſt and third ſort are accounted a pack, and forty ſtaves of middlings make alſo a pack.

An acre of land, if well grown, and what is deemed a full crop, often produces nine packs of kings, nineteen of middlings, and two of ſcrubs. The common price per pack of the firſt ſort, is twenty, the ſecond ſort fourteen, and the third ſort eight ſhillings. But in a French war, they are generally double theſe prices.

The Expences attending a Crop per Acre are,

	l.	*s.*	*d.*
1ſt, Rent of the ground for the crop, which is one year and a half	5	0	0
2d, Ploughing and ſowing	0	15	0
3d, Firſt dreſſing or delving	1	0	0
4th, Second delving	0	10	0
5th, Hilling	0	15	0
6th, Cutting and carrying home	1	15	0
7th, Tythe	0	5	0
8th, Clearing off the ſtalks, and binding them in bundles	0	5	0
9th, Making out, at two ſhillings per pack, ſpleets, ſtaves, and wreaths included	3	0	0
All which make the total expence, attending one acre of teaſels	13	5	0

This, excluſive of ſeed, which is not often bought, becauſe enough may be ſaved in making out the crop in winter: but if the ſeed be bought, it is generally valued equally with wheat. Therefore, if two buſhels be ſown on the acre, ten ſhillings may be added as the medium price; which makes the whole expence of one acre thirteen pounds fifteen ſhillings, if it ſhould produce thirty packs. But ſuch produce is not always the caſe, for twenty is to be eſteemed a middling crop.

With reſpect to crops of corn, raiſed amongſt the plants, it is uſually practiſed in the places mentioned in my preceding letter on this ſubject; and indeed it has been mine to plant field beans, or garden beans, at about three feet diſtance ſingly from each other, in a promiſcuous manner over the teaſel land: which crop of beans, by the cultivation neceſſary for the teaſel, is greatly forwarded in growth, and often produces from four to five and ſix ſtalks from one bean, well loaded with cods. This crop is no injury to the teaſel crop the firſt year, and frequently pays the expence of labour attending the whole.

The crop, which generally ſucceeds the teaſel, is wheat. The ground, by being frequently delved and kept clean, during the teaſel crop, becomes very fit for this grain, and generally produces very large crops. Forty buſhels per acre is not uncommon, though the land in itſelf is often ſuch as is not annually worth more than ten ſhillings per acre. Hence, I think, it is evident, that a crop which well ſhades the ground, (in ſummer) and that has been two or three times turned and cleaned from all weeds, before ſuch ſhading, greatly fertilizes the land on which it grows. But I have frequently obſerved an error, to which the occupiers of ſuch land are too liable after theſe fertiliſing crops. This error is the ploughing away (by over cropping) the profits that would enſue. If after its being thus fertilized by the crops of teaſels, it were to be laid down with ſuitable artificial graſs-ſeed, ſown amongſt wheat, and properly manged afterwards, it would, I am experimentally ſenſible, be a laſting improvement. I am, gentlemen, deſi-

rous

rous that a ſupply of uſeful matter may be furniſhed inſtead of things merely ſpeculative * and controverſial, neither of

* We cannot agree altogether with our friend Ruricola, as to his ſentiments of our laſt number, which certainly contained ſome very valuable pieces, even of the *practical kind*. It is poſſible, there were ſome others more prolix, and digreſſive than is neceſſary, but none trivial, or inſignificant, as to the ſubjects themſelves. We muſt beg of Ruricola to conſider, that what we publiſh, with relation to agriculture, is not intended only to communicate the reſult of long experience, though that is one moſt eſſential part, but to incite and promote invention, and the trial of new articles of culture, and more profitable methods. Now, every new matter muſt be a *ſpeculation*, before it can be reduced to practice: and as trials are in ſuch caſes ſometimes attended with variety of events, it neceſſarily leads to a difference of concluſions, and that to controverſial writing, by thoſe who publiſh their opinions. This is, nevertheleſs, ſo far from being inconſequential to the public, that it can be only by ſuch means all parties can be at length ſet right. For on the compariſon of a number of various facts, the true reaſon of the variation will in time appear; and each perſon will be led to rectify his own opinion by the whole truth, inſtead of its being warped by partial obſervations. There can nothing more clearly illuſtrate this, than the very point of controverſy, which gave riſe to Ruricola's complaints; I mean the queſtion, "Whether bur-"net be worth cultivating?" which turns on a previous queſtion, "Whether neat cattle, ſheep, and horſes, or ſome of "them, will eat it as graſs or fodder?" Of this, we ſee extremely different accounts have been given. Some ſay they will eat it preferably to almoſt every thing; and others again ſay, they will not eat it at all. Seemingly flat contradictions: and yet we may venture to aſſert, that both parties are in the right as to facts, as far as they know them. For on a very large baſis of information, privately procured from perſons of unqueſtionable good ſenſe and veracity, it appears, that in many inſtances the beaſts before-mentioned will *eat burnet greedily*; and that others, nevertheleſs, *refuſe it as obſtinately*. Whence this proceeds, whether from the variation of the ſoil where the burnet is cultivated, or from the mixture of ſome particular ſpecies diſguſtful to the beaſts, with that which they like, is yet undetermined; but certainly it merits our moſt attentive inquiry. If burnet be a proper food for theſe beaſts, its extreme hardineſs, and the greatneſs of the burden, at leaſt on ſome kinds of land, would render it a very valuable article of culture. We muſt, moreover, beg of Ruricola, and other gentlemen who may have made the ſame reflections on ſome letters we have publiſhed, which

of which produce but very little or no benefit to the practical farmer; and which, I am ſorry to ſee, take ſo much room in the laſt publication.

RURICOLA GLOCESTRIS.

L.

P. S. In compliance with your requeſt, I have once more ſent my concluſion of the culture of the teaſel; and now take this opportunity to ſay, that the paper ſigned

which may not merit commendation in all reſpects, to obſerve, that where uſeful matter is ſent to us, we cannot dictate the manner of writing, nor lop and prune every exuberance or redundance that may ſhoot forth along with the fruit. We muſt, in ſome degree, take what our correſpondents offer us, when any thing good is contained in it, as we receive the benefits of nature; and if we gain ſome ſound grain, muſt not complain of the chaff and ſtraw. Should we play the critic too ſtrictly, we ſhould give offence, and perhaps juſtly, where it would not be well to do it; as many are more fond and tenacious of their particular manner of writing, and jealous of correction in that point, than in what reſpects the merit of the ſubject. It is better, therefore, both for the public and ourſelves, to bear a little with the particular humour of perſons, who can communicate uſeful knowledge, than to loſe the information by too great nicety. We hope, conſequently, our kind friend Ruricola, whoſe own natural good ſenſe, and application to practical knowledge, leads him to admire ſolid reaſonings on known facts, delivered with method and conciſeneſs, will not any longer think *ſpeculation*, and even ſometimes *controverſy*, ſo wholly foreign to our purpoſe; eſpecially as it is not practical farmers only, but for the moſt part gentlemen, who have acquired a taſte for farming, whoſe attention we are to engage; and a mere detail of practical inſtructions, would not be ſo agreeable to them as a mixture of ſuch, with ingenious ſpeculations and hints, for the introduction of new articles, or new methods: and perhaps it is more the proper office, with reſpect to the public, as well as to the diſpoſition of gentlemen, who take this turn, to be the enterprizers of improvement, than the imitative practitioners only of the Art of Huſbandry. The great encouragement our work has met with from the public, inclines us to believe we are right in this opinion: for though every individual does not agree in liking every particular, as we are frequently told, but on the contrary indeed ſhow themſelves abſolutely oppoſite in their choice, yet all concur in finding ſomething worthy their notice; and this is what we are to make our principal aim: being, indeed, from the very nature of the thing, all that is poſſible in our power. R.

P. B. C. No. 56. muſt, I think, be acceptable to many correſpondents: and it would add greatly to its utility, if the propoſal in the note thereon, ſigned R. E. O. was complied with: in order to which, if your correſpondents, who are acquainted with botany, in the ſeveral counties, and places, would add the common names by which theſe weeds are called by them, they would, in all probability, become better known to the leſs learned reader, in which, if I find any ſteps taken to execute this plan, I intend to take ſome part *. R. G.

L.

NUMBER II.

Account of the Cure of Worms in Horſes, by the Uſe of Sea-Salt, Sal-Prunellæ, or Salt-Petre.

To the Editors of the MUSEUM RUSTICUM.

Experto crede.

GENTLEMEN,

SALT having been recommended by ſome of your correſpondents, I was induced to try it on a foal, which after weaning, was brought very low by ſmall yellow worms about an inch long (ſeveral of which were found in his dung) called in theſe parts, needle-worms. I thought the uſual remedies too ſtrong for a foal; and therefore ordered him a ſpoonful of common ſalt, in a maſh of oats and wheat-bran, every other night for a fort-

* A complete hiſtory of weeds, diſtinguiſhed by their vulgar, and local, as well as botanical names, with the time of their ſpringing and flowering, and an account of the beſt expedients for extirpating thoſe that do not ſubmit to common and general methods, would certainly be a very uſeful work. The letter mentioned here, publiſhed in the *Muſeum*, for October laſt, and which, we have reaſon to believe, came from a very reſpectable hand, will, we hope, be the foundation-ſtone of ſuch a performance: and we ſhall be greatly obliged to Ruricola, for the aſſiſtance he ſo kindly offers. R.

night,

night, keeping him in the ſtable at night, and turning him out in the day-time.

This, gentlemen, ſucceeded to my utmoſt wiſh: I could diſcover no worms after he had taken the ſalt a week; and he is now in full ſpirits and fine order.

I am told by a gentleman who conſtantly uſes it, that there is no better preſervative againſt the greaſe, than either ſal-prunellæ or ſalt-petre: his method is, to give his horſe, at firſt taking him into the ſtable, three doſes of two ounces each, in maſhes, one at night, and the ſecond and third the morning and evening following; repeating it two or three times in a winter, as he finds occaſion.

I received the firſt hint from your uſeful repoſitory; and * thought I could do no leſs than acquaint you with the ſucceſs of my experiment.

I am, GENTLEMEN,

Mumby-Hall, Lincolnſh. Your obedient Servant,
Dec. 16, 1765. G. S.

NUMBER III.

Deſcription of, and Obſervations on ſome propoſed † Improvements on the Cutting-Box for Hay and Straw, in a Letter from Mr. Crokatt *to Mr.* Comber; *and an Anſwer from Mr.* Comber *to him.*

SIR,

I Return you thanks for the many improvements I have received by peruſing your letters publiſhed in the *Muſeum Ruſticum*; and, as I make no doubt of your readi-

* We are much obliged to this gentleman, and are of opinion, that nothing will more contribute to render our labours beneficial to the public, than the being able, by the communication of ſubſequent facts, furniſhed us in this manner, to verify and illuſtrate what has been before advanced in former letters. E. A.

† The cutting-box has been deſcribed, and its uſe explained, in the firſt Volume, No. 61. p. 258. and in the fifth Volume, No. 42. p. 208.

neſs

neſs to communicate any knowledge in your power to a brother farmer, and a friend to *all* improvements; I, therefore, take this liberty to trouble you upon the ſubject of a cutting-box for horſe-meat.

I peruſed your letter, in that pamphlet, dated 29th March, 1764, wherein you are ſo good to communicate ſome propoſals towards improving that inſtrument; and as I have employed a man, for above two years paſt, to cut ſtraw and hay, when mixed together, into *chaff*, and (at feeding my horſes, I mix two pecks of chaff with one peck of oats) I give the cutter eighteen-pence a ſcore for cutting; and, I believe, he and his little boy cut above forty buſhels a day, at this time of the year, and more in ſummer. Now, as my ploughman, *&c.* have but ſixteen-pence a day in winter, and eighteen-pence in ſummer, I think, a conſiderable ſaving might be made, if I had a box of my own; and I had actually beſpoke one from my wheelwright, on the thirtieth of September laſt; but on ſeeing your letter on that ſubject, I ſtopped him from making it, upon a preſumption that a box made by your improvements would be better. I have ſince ſhewn your propoſals to my wheelwright, who is a good workman: he and I both approve of lengthening the handle, as it will certainly give a greater purchaſe. As to your other propoſal, of making three knives in place of one, I thought that would anſwer the benefit you propoſed. But my wheelwright told me, that he heard of one that was made with three cutting-knives, by the directions of a man who lived in *Whitechapel* or *Wapping*, which he found to be ſo hard work, *&c.* that it did not anſwer the purpoſe; therefore he again uſes one of the old faſhion. As he neither knew the man's name, nor certain place of reſidence, ſo I have not been able to find him out.

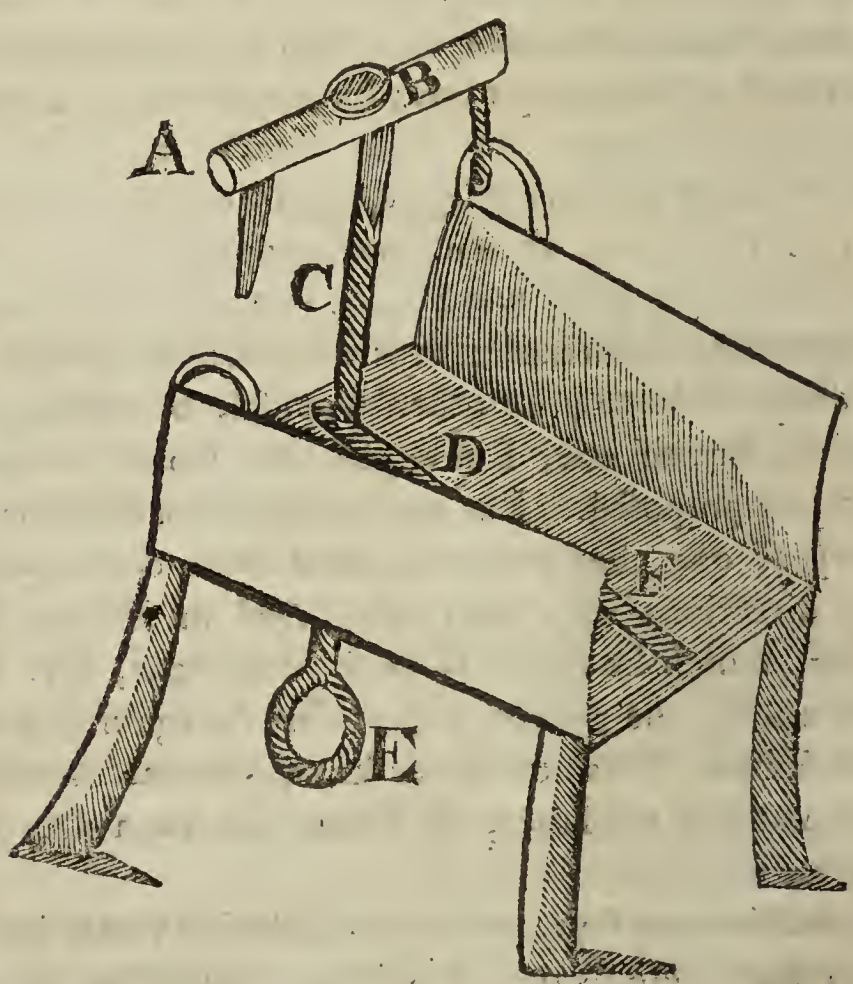
My chaff-cutter ſays, he never heard of any new improvements; but there is one, I believe, you do not know of, *viz.* a piece of wood, *as long* as his box is *wide*, with three iron tongues in it, like thoſe of a hay-fork, which he puts into the bundle of hay and ſtraw to be cut; and by a rope

fixed thereto under the box, he preſſes that inſtrument down with his left foot, and, in conſequence, keeps the bundle tight, by which means he cuts the chaff with great eaſe; and after every cut, raiſing his left foot, he puſhes his ſheaf or bundle with his left hand, and then preſſes it down with his left foot, and cuts with his right hand.

Next time he comes to cut for me, I ſhall be more curious in examining his machine; and if I know any thing new on the ſubject, I ſhall be glad to inform you. Mean while, I pray the favour, that if you know any of your propoſals being put in *practice*, (as I obſerve yours is only in *theory*) you will inform me thereof, and its conſequence; whereby you will much oblige,

Sir, your moſt humble ſervant,

JAMES CROCKATT.



Explanation of the Machine for cutting of Chaff.

A, The preſſer, which Mr. *Crockatt*'s chaff-cutter uſes.

B, The knotted top of the rope, by which it is faſtened to the preſſer.

C, The

C, The rope.

D, The ſlit in which it moves, as the cutter puſhes the ſheaf forwards.

E, The loop, in which the cutter puts his left foot.

F, The box to contain the hay.

P. S. I cut chaff every three or four weeks; nor do I know what a friend to the *Muſeum Ruſticum* means by *freſh and freſh:* ſurely, it is not *every day.* I have a drill-plow, three horſe-hoeing ditto, one guide ditto, and two harrows, all made on purpoſe for the drill huſbandry; and I believe they are *as compleat* a ſett as ever was made. *Alexander Crighton*, coachmaker, in *Edinburgh*, *Scotland*, makes them, by the direction of an ingenious gentleman, who has been improving on *Tull* and *Du Hamel.* I have drill'd *burnet* and *lucerne* with them; alſo turneps, wheat, winter-tares or vetches, and *Scotch beer.* I received them only in September; about four weeks ago: and I have tranſplanted above fifteen thouſand lucerne and burnet plants. They all thrive.

SIR,

IN due courſe I received the favour of your letter, which needs no apology. I ſhall always eſteem myſelf happy, to be able, by any communication, to oblige the *ingenious*, and eſpecially, *improvers* of ſuch *apparent candour* as yourſelf. As the ſtudy of *mechanics* made one of the moſt delightful parts of my employment in the univerſity, I have occaſionally, ever ſince, endeavoured to apply that knowledge to the good of the *laborious* part of my ſpecies. I have long been ſtruck with that beautiful feature in Mr. *Philips*'s character of a good man, (in his poem, *Cyder*) if I remembr aright, *viz.*

"Intent on what may *eaſe* or *ſweeten* human life."

Your expectation, Sir, of *ſaving conſiderably*, by having a cutting-box of your own, uſed by your own ſervants, ſeems *plauſible*, and yet ought not to be very much depended on, eſpecially at the firſt, however judiciouſly it may

be conſtructed, for two obvious reaſons, *viz.* 1ſt, that *practiſed* perſons will do much more work, with an indifferent inſtrument, than *unpractiſed* ones with a very good one: and, 2dly, becauſe no ſervants hired by the day, will do nearly as much work as thoſe who work *good hands*, *good hire*. Whatever improvements, therefore, you make in your cutting-box, I ſhould deſire you to let your *old* cutter employ it for ſome time, without any talk of lowering his wages; and when you ſee what advantage he makes of ſuch improvements, you may then argue him into a reaſonable lowering of his wages, or take on a new one.

As to your wheelwright's objection to uſe three knives, it ſeems worſe grounded than one would expect from a *good workman*, as you call him. He ſhould have conſidered, that no *ſenſible* man can pay any regard to ſo *uncircumſtanced* an account as he gives. If the work of that *cutting-box* proved *too hard* to be advantageous, it might be ſo from ſeveral *unknown* circumſtances in the *conſtruction* or *uſe* of it; and not at all from the *ſingle* circumſtance of having three knives inſtead of one.

But, if he had been acquainted with *all* circumſtances, and it were ſure, that the *overballancing* diſadvantage aroſe ſolely from the circumſtance of two additional knives; yet he ſhould have conſidered, that, what might be an impracticable improvement on the *Whitechapel* or *Wapping* man's plan, might not be ſo on mine; for he had juſt ſeen, that by *lengthening* the *handle*, I *increas'd* the *power*; and that, in *direct proportion*, if he knows any thing of the principles of mechanics; ſo that if the *reſiſtance* to be overcome, *increaſe directly* as the number of knives does, yet if the power be *increaſed* in the ſame *proportion*, that is, the handle made three times as long as before; the three cuts will be made with as much eaſe as the one was.

If your wheelwright be *ingenuous*, he may probably remember ſome circumſtances of the perſon giving him the account; and the *Whitechapel* or *Wapping* man may be found out, and his inſtrument examined; for this is deſireable: as experiments which do not ſucceed, often pay the

expence

expence of examination, while they point out things to be *avoided*; juſt as ſucceſsful experiments do things to be *purſued*.

I think, ſir, I perfectly comprehend the mechaniſm of the *preſſer*, (for ſo I may juſtly call it) which your cutter uſes; only, I apprehend, there is a ſlit, lengthwiſe of the cutting-box, in which the rope, faſtened to this preſſer, moves. But, *however uſeful*, or even *neceſſary*, this preſſer may be, in the *old* cutting-box, it will be utterly uſeleſs in my *improved* one; the main deſign of which is, to diſpatch at *one* ſtroke, all the cutting neceſſary for the hay and ſtraw to be *at once* laid in the box. The improved cutter will cut in the ſame manner as the *celebrated Scotch* maiden, in the execution of criminals.

Betwixt every two ſtrokes, the cutten hay and ſtraw is to be cleared away, and freſh laid. And here, ſir, I muſt obſerve, that an anſwer to the objection of the hardneſs of the work in a good meaſure ariſes. On ſuppoſition that the work is *hard*, though, I believe, it may be ſo contrived as to be *eaſy*, the man who gives only one cut at once, muſt allow himſelf little or no reſpite; otherwiſe he will diſpatch little work: but the man, who by his improved machine, gives three or more cuts at once, can well afford to ſtay 'till the cuttings are ſwept out, and freſh fodder laid.

How ſmall you propoſe to have your hay and ſtraw cutten, I know not, ſir: I apprehend you would have it cutten very ſmall, as you call it chaff; which, with us, ſignifies only the hullings of the corn threſhed. In proportion as you would have your hay and ſtraw cutten ſmall, you muſt increaſe the number of knives, ſo as to cut the hay and ſtraw laid in the box *at once*, into as many, and as ſmall parts as you wiſh.

The great principle of all *mechanical inventions* is to ſave *time*, *labour* and *expence*; or, in other words, with a *given power*, in a *given time*, to execute the *greateſt quantity* of work *beſt*, and with *leaſt expence*. The keeping of ſtraw and hay to be cutten, in a bundle cloſe and tight, ſeems

to

to counteract this great end of mechanics: for, by this means, the hay and ſtraw become a *much more compact* and *ſolid* body, make greater reſiſtance, and require greater force to overcome them, than if they were looſely ſpread over a larger ſurface. In order, therefore, to cut the hay and ſtraw to the beſt advantage, I would increaſe the breadth of the bottom of the cutting-box, and, conſequently, the length of the knives. In order that the edges of theſe knives may not be blunted *unneceſſarily*, care muſt be taken in the conſtruction of the bottom, that there be a groove correſpondent to thoſe edges; ſo that the extremities of the knives may fall on what is ſolid, but all the middle parts may touch nothing when they have cut through the hay and ſtraw.

Care muſt alſo be taken that the hinge may be very glib, and kept oiled.

If it is thought neceſſary, a ſpring alſo may be ſo fixed, by an upright ſtandard from behind the hinge, as to be compreſſed, when the knives are raiſed, and by its elaſticity to aſſiſt the force of the knives in their deſcent.

I propoſed my former improvements, as I do theſe, as a *reaſonable theory*, which there has been no room to put in *practice*. I want good *workmen*, and I have no *leiſure*: hereafter I may make a trial. In the mean time, I recommend them to ſuch *ingenious* and *candid* gentlemen as yourſelf, who have opportunity.

I ſhould think, ſir, that your method of cutting chaff every three or four weeks, might be nearly as good as cutting it much oftener. Indeed, the longer it is kept cut, probably *ſomewhat drier*, and *leſs nutritive* it may be; eſpecially unleſs it be kept cloſe in an heap.

But in this country, ſir, we have no idea of the *neceſſity* or *utility* of a cutting-box. 'Till I ſaw the account of one in the *Muſeum Ruſticum*, I knew not that any ſuch thing was ever uſed. I then ſaw, that as *maſtication*, eſpecially of dry food, is very neceſſary to *good digeſtion*; and this again to *health* and *nutriment*, an inſtrument which anticipated this *natural operation*, (*viz.* maſtication) muſt be very

very uſeful for horſes, eſpecially the *old* and the *young*, which cannot at all, or without great difficulty, macerate their dry food ſufficiently by their teeth, which we juſtly call *grinders*. A *ſpeedy* feed for horſes is often very expedient, and eſpecially in a courſe of labour, in which time is *precious*. The cutting-box, therefore, may be very uſeful; and this conviction of its uſefulneſs, was the ſole reaſon why the public was preſented with the conjectures of,

SIR,

Eaſt-Newton, Your very humble ſervant,
Dec. 2, 1765. THOMAS COMBER.

I am glad, ſir, to find that you have acquired ſo good a ſett of inſtruments for the drill-huſbandry. I ſhall enquire about them, agreeably to the directions you are pleaſed to give. You, ſir, highly deſerve the praiſes of the public for the trials you are making with theſe inſtruments in ſowing wheat, *&c.* I hope you will communicate, by the channel of the *Muſeum Ruſticum*, the effects of all your experiments, and that much the greater number of the plants which you have tranſplanted are of the *lucerne*, a graſs I eſteem every day more and more; while, on the contrary, I think the burnet ſo unvaluable, as to deſign to root it out of my ground.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS Mr. *Crokatt* is your avowed correſpondent, I conclude, he can have no objection to the publication of his letter to me, concerning the improvements of the cutting-box, with my anſwer. As all your readers may not eaſily apprehend the conſtruction of the *preſſer* uſed by Mr. *Crokatt*'s chaff-cutter, I have added a rude delineation of it, as apprehended by me, with a ſlit, which either *is*, or *ought to be* in the bottom of the box. It is true, that if there be only

only an hole at F, the preſſer may be uſed; but not with nearly the ſame convenience, as if by means of a ſlit, the rope be always perpendicularly under the preſſer. The wooden part of the *preſſer* muſt be broad enough to admit the head of the middle tooth to be faſtened; and alſo before or behind it an hole, for the knotted top of the guiding-rope.

I am, GENTLEMEN, as uſual, *&c.*

THOMAS COMBER.

NUMBER IV.

Obſervations on the Cauſes of the preſent high Price of Corn, and the Expedience of continuing the Bounty; in a Letter to the Editors.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IT has for ſome time been much debated, to what cauſes the high prices of corn and other proviſions are to be attributed, and the proper means of reducing them. In a matter of ſuch intricacy, it commonly happens, that people are of different opinions, according to the light in which they view it. The following reflections relate to one point only, the exportation of corn.

Many perſons have ſuppoſed, that the high price of corn is owing chiefly to the exportation, and the bounty given by the government; and your correſpondent, *J. L.* in a very ſenſible Letter, No. XLV. of your 4th Vol. having touched upon ſome of the principal grounds of that opinion, they ſhall be duly attended to.

It is on all hands agreed, that granting a bounty upon corn exported, was a wiſe meaſure; and that it has encouraged the farmers to make great improvements, and raiſe more corn than formerly; inſomuch, as *J. L.* ſuppoſes, "that England produces as much grain in one

"good year, as the home conſumption amounts to in "ſeven." I have met with ſome other high calculations of this ſort, and think it neceſſary to enquire particularly into them, from ſome of the beſt authorities we have, and the papers furniſhed by your ingenious correſpondent *Y. Z.*

About ninety years ago, Sir *William Petty*, who was very ſkilful in political arithmetic, computed the people of England and Wales at about ſix millions. About twenty-five years afterwards, Dr. *Davenant*, another gentleman very curious in theſe matters, reckoned them only about five millions and a half; and that all the arable land then employed in raiſing corn, amounted to about eight millions of acres. It was the general cuſtom at that time, to fallow every third or fourth year; ſo that the land actually under corn, was between five and ſix millions of acres; and at a medium of theſe eſtimates, there was then growing every year, nearly one acre of corn *per* head. This was ſufficient for the home conſumption; and very little was at that time exported.

It was alſo then reckoned that the people in England and Wales increaſed at the rate of ſomewhat leſs than a million in a century: this was ſixty-five years ago; and if we ſtate the increaſe ſince that time at a million, it may be thought a large allowance; and at this rate, the number of people will now amount to near ſeven millions.

The improvement of arable lands has made a quicker progreſs than the increaſe of people; for now there is a conſiderable ſurplus of corn for exportation. This improvement is not altogether in breaking up new land, not then in tillage; but partly by fallowing leſs of the ſame land; and perhaps in raiſing ſomewhat larger crops: and therefore the land now every year under corn, may not much exceed eight millions of acres.

Some may probably think, that this is not enough to ſupply the home conſumption, and alſo the exportation. It is probable that the home conſumption is rateably greater at this time, than it was ſixty-five years ago; and that

near ſeven millions of people may, for bread, and all other uſes for themſelves, and cattle, &c. require now above ſeven millions and a half acres of corn every year. If this will ſerve for the home conſumption, we ſhall have enough left to ſupply the exportation, as will appear from the following account of it, being the quantity exported, at an average of ten years, from 1747 to 1756, incluſive; in which more corn was exported, than in any other ten ſucceſſive years.

Corn exported. Quarters	Value.	Tons.	Freight.	Bounty.
Wheat 447,291				
Malt 311,591				
Barley 76,774	£. 1,200,000	150,000	£. 300,000	£. 172,482
Rye 67,202				
Oatmeal 2828				

The quantities exported are agreeable to the cuſtom-houſe accounts; and the bounty, and number of tons, are, I believe, nearly right. The value is computed at moderate prices; and the freight, being chiefly to Spain, Portugal and Italy, is, at a medium, reckoned at forty ſhillings *per* ton. Theſe, though not exact, may ſerve to give a general idea of the exportation.

Admitting that there is produced annually, of theſe ſorts of corn, three quarters *per* acre, the above quantity might, at that rate, be the growth of only about 300,000 acres, when the exportation was at the higheſt; which is not a twenty-ſixth part of the land every year under corn: but it is a much ſmaller proportion, upon an average of theſe and former years; and therefore it ſeems very improbable, that ſo ſmall a part exported, ſhould raiſe the price ſo much, as is commonly imagined.

Let us next conſider the opinion of our great crops. If they are in good years, enough for ſeven years home conſumption, the medium, taking good and bad ſeaſons, may be half that quantity; and then the crops every year, are ſufficient for the home conſumption three years and a half.

half. We have ſhewn, that the quantity exported is but a very ſmall part of the annual growth; ſo that when that is deducted, there will ſtill remain every year, more than ſufficient for three years home conſumption; and we ſhall lay up in ſtock two-thirds of this every year. At this rate, in ten years only, ending in 1756, we ſhould have had a ſtock of corn, enough to ſerve us for twenty years to come; whence then did it happen that corn was ſo dear in 1757? Can it be ſuppoſed that corn would be dear, while we had ſo much in ſtore? And yet, if this extraordinary fertility has been of any long ſtanding, as ſuppoſe for thirty or forty years; what ſurpriſing quantities of corn ought we to have now in the kingdom?

But the truth is, whatever may be the crops in ſome extraordinary ſeaſons, they are not much more than ſufficient for the home conſumption and exportation, taking them at a medium for ſeveral years. When they fall ſhort of this, we have recourſe to the ſtock in hand, and then corn advances in price; and when they exceed, we lay up in ſtore, and then corn becomes cheaper.

Dr. *Davenant* ſays, p. 82 of his ſecond Eſſay, "By the "beſt accounts we are able to procure, from ſuch as have "looked into theſe things, we find, that in England, in "a plentiful year, there is not above five months ſtock of "grain at the time of the ſucceeding harveſt; and not "above four months ſtock in an indifferent year."

The difference here between a plentiful and an indifferent year, is but one month's ſtock, which falls very far ſhort of the plenty now ſuppoſed in good years: and notwithſtanding this ſlender proviſion in 1699, when this was written, and that corn was then dear, we find that for nine years afterwards, wheat never roſe to more than forty-ſix ſhillings and ſix-pence *per* quarter; and for ſix years after that, wheat was at near three pounds a quarter; though the quantity exported in both theſe times was nearly the ſame. Alſo, for ſome years before 1699, wheat was above three pounds *per* quarter, though none was exported. All which ſhew plainly, that the exportation has but a ſmall influence upon the price of corn.

Though the quantity of corn exported, bears a ſmall proportion to the annual produce, yet, as a branch of trade, and in a national view, it is of great importance; for the value of the corn exported, and the freight of 150,000 tons, ſhipped on our own bottoms, amount, at a medium of the above ten years, to a million and a half ſterling: and as all this is the produce of our ſoil, raiſed by the induſtry and labour of our people, and employment of our own ſhipping, it is ſo much every year gained to the nation.

It is generally acknowledged, that we have got this profitable trade by the bounty; but many perſons are of opinion, that a bounty is now not only unneceſſary, but very injurious; that giving a bounty upon corn exported, is raiſing the price ſo much upon our home conſumption, and ſinking it to foreigners.

This is the principal objection made to the bounty; it is popular, and ſeems plauſible: but if it is now a juſt objection, it ſeems to be ſo againſt the bounty at firſt, as well as againſt its being continued: for if it now raiſes the price at home, and ſinks it to foreigners, it has done ſo ever ſince it was granted; and we have been induſtrious to improve our lands, and gain a foreign trade, only to make ourſelves poorer, and for the benefit of foreigners.

But the objection is founded upon a miſtaken or partial view of the matter; for, if the bounty contributed nothing to make a greater plenty of corn, the argument would be of ſome weight; but when it is acknowledged, and is undoubtedly the fact, that the bounty has excited a greater induſtry, and occaſioned the raiſing of a much greater quantity of corn; and when it appears that this additional quantity is equal to, or exceeds the exportation, the objection vaniſhes; and the bounty, ſo far from being an injury to our own people, appears to be a benefit to them: they enjoy a greater plenty of corn, and a new branch of foreign trade is alſo gained, which is become one of the beſt we have.

We cannot determine generally, from the price of a ſingle year or two, whether corn is cheap or dear; nor is

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the bounty chargeable with every accidental riſe, which may be from other cauſes; and ſeveral other cauſes are aſſigned, which, no doubt, have ſome influence. But the queſtion is, whether, upon the whole, and taking a number of years together, the bounty has raiſed the price. In this view it would, doubtleſs, be conſidered by the legiſlature; and is the proper rule to determine, whether the bounty is a national benefit or injury.

The following table, ſhewing the mean price of wheat at *Windſor* market, at ſeveral periods, for one hundred and ſixty-nine years, will ſet this matter in a clear light; I have divided that time into periods of twenty-five years, (except the firſt, the account going no higher) to ſhew the progreſs of the prices; and then collected them into three longer periods, to give a more general view of them.

	Years.	*l.*	*s.*	*d.*	Years.	*l.*	*s.*	*d.*
From 1594 to 1612	19	2	2	$5\frac{1}{4}$				
1613 to 1637	25	2	7	4	69	2	8	$5\frac{3}{4}$
1638 to 1662	25	2	15	8				
1663 to 1687	25	2	5	$3\frac{1}{2}$	25	2	5	$3\frac{1}{2}$
1688 to 1712	25	2	8	$5\frac{1}{2}$				
1713 to 1737	25	2	0	$7\frac{3}{4}$	75	2	2	$5\frac{1}{4}$
1738 to 1762	25	1	18	$2\frac{3}{4}$				

By this it is evident, that wheat has been cheaper the laſt ſeventy-five years ſince the bounty commenced, than it was for ninety-four years before.

It is farther obſervable, that for the firſt ſixty-nine years, the price of wheat was continually riſing, and ſince the bounty was given, it has been continually ſinking; which ſeems to be a plain proof, that this ſinking of the price was owing to the bounty.

The twenty-five years, from 1663 to 1687, I have ſtated ſeparately; becauſe, in that period, a duty was firſt laid upon the importation of corn; which, with two additional duties afterwards, amounted almoſt to a prohibition; the conſequence of which is here viſible in the price; for

for wheat, which for many years before was riſing, did at this time ſink more than ten ſhillings *per* quarter.

The irregularities in the price, in ſome of the periods of twenty-five years, are to be accounted for from the hiſtory of thoſe times. Agriculture is one of the arts of peace, and it flouriſhes moſt in peaceable times. A foreign land-war, and more eſpecially a civil-war, very much checks its progreſs; deprives the huſbandman of many of his beſt hands, and raiſes the price of labour. And accordingly we find, that at ſuch times, wheat generally advanced in price; but not rateably in a naval-war, for obvious reaſons.

As to the other part of the objection, that giving a bounty ſinks the price to foreigners; if it opens a market for our corn abroad, and, at the ſame time, makes it cheaper at home, have we reaſon to complain? Or, can we expect that foreigners will buy of us, if we do not make it their intereſt to do ſo? But it is to be feared, that the opinion we have taken up of an extraordinary fertility of our ſoil, and a ſuperiority in agriculture, are leading us into a dangerous error; and England, that was formerly liable to frequent ſcarcity, and ſometimes to famine, for want of corn, is now imagined to have a monopoly of it.

What elſe is the meaning of that "opinion, mentioned by *J. L.* of ſome, converſant in the corn-trade, that "there would not be a quarter leſs exported, though no "bounty was to be allowed." Can any perſon, the leaſt converſant in trade, believe, that eight or ten *per cent.* makes no difference to the buyer, if he can ſave ſo much by dealing elſewhere? And what elſe is meant by ſaying, "that foreigners are under a neceſſity of taking off large "quantities of theſe commodities," *viz.* our corn?

All the corn we have ever exported, upon an average of ten ſucceſſive years, might be produced upon twenty-two miles ſquare of land: and can we ſuppoſe that this ſecures to us a monopoly? Such an opinion would naturally lead us (as we ſee here it does) to raiſe the price upon foreigners; the conſequences of which are certain, the loſs of the trade, and a fatal blow to improvements in agriculture.

Many countries produce large quantities of corn, as well as England; and ſeveral who have vaſt tracks of improveable land, are of late become ſenſible of the importance of agriculture, and are encouraging it with a ſpirit unknown to former times. Surely then, this is not a time to amuſe ourſelves with the notion of a monopoly, or take any ſtep to ſlacken the induſtry of our farmers. On the contrary, we have great reaſon to apprehend, from ſuch a competition, a decline of our corn-trade, and a check to the improvement of our lands; and therefore it is neceſſary for us, now more than ever, to promote our agriculture, by every encouragement, while we have any waſte or unimproved lands in the kingdom.

The example of other ſtates laying up corn in public granaries, who have a ſmall territory, where the lands are unfriendly to corn, or not productive of it without infinite labour, may not be adviſable for us to imitate; becauſe our circumſtances and ſituation are not at all ſimilar. We have experienced the great benefit ariſing from the improvement of part of our lands, and exporting their product. We have ſeveral millions of acres more in Britain and Ireland to improve; and if improved to what they are capable, what a vaſt acceſſion of national wealth would this be to us! While we are in this ſituation, it does not appear to be our intereſt to hoard up corn, but to trade in it.

There is one extraordinary circumſtance reſpecting the price of corn, that deſerves our particular notice. It is now about a century ſince corn began to abate in price; occaſioned, as before mentioned, by laying a duty upon corn imported. The price of all other things is very much advanced ſince that time; and it would not, I ſuppoſe, be over-rating that advance at a fourth part; and to ſay, for example, that the labour, which, one hundred years ago, was worth eight-pence, would now coſt ten-pence. By the ſame rule, corn ought to have advanced alſo a fourth part; and wheat, which was then at fifty-five ſhillings and eight-pence, ſhould now be worth three pounds nine ſhillings

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and ſeven pence *per* quarter, as the common price: whereas the common price, for theſe laſt hundred years, has, in fact, been no more than two pounds three ſhillings and ten pence halfpenny *per* quarter; ſo that wheat, inſtead of advancing, rateable to other things, has been ſinking greatly; inſomuch, that for the laſt twenty-five years, ending in 1762, it has not been a great deal above half as dear as moſt other things. None of the common arguments will account for this; for they all ſuppoſe that corn is dearer. Engroſſing, foreſtalling, exporting, more trade, or more people, are all of them ſaid to create an artificial or real ſcarcity of corn; and conſequently make it dear: if they really have this effect, the thing is ſtill the more extraordinary; that corn, notwithſtanding all theſe diſadvantages, has been ſo much cheaper than every thing elſe, and ſtill, upon the whole, continues to ſink.

Wheat has indeed been higher lately than the common price; but when at higheſt, was cheaper than the common ordinary price one hundred years ago: whence is it then that the poor are really diſtreſſed; and that corn ſhould now be reckoned ſo very dear? A clear ſolution of this difficulty, will, I apprehend, diſcover ſome other cauſes of the preſent complaint, than are commonly aſſigned; and the true ſolution of it is recommended to the conſideration of your ingenious correſpondents.

I am, GENTLEMEN,

Middleſex, Your conſtant reader,
Dec. 12, 1765. and humble ſervant,

E. S.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS the prejudices againſt the bounty on corn ſeem to gain ground, I thought it might be of uſe, at this time, to offer ſome reaſons in favour of a meaſure, which I think of great utility to the public; and if I am miſtaken, I hope

I hope that ſome of the hints in the incloſed letter, if you think proper to publiſh it, may occaſion a more accurate examination of this matter.

This letter growing too long *, I have omitted ſome things relating to the ſubject, and but ſlightly touched upon others; particularly that of public granaries; which, in my opinion, are by no means adviſeable in England; though I own the ſame ſcheme, and alſo withdrawing the bounty, have been ſtrongly recommended by ſeveral perſons of reputation; particularly by Sir Matthew Dicker, in his Eſſay on the Decline of Foreign Trade, from which your correſpondent J. L. ſeems to have taken, almoſt verbatim, what he ſays upon theſe heads. But thoſe opinions were taken up before the advantages of exportation were ſo well known as they are now.

The want of an improved drill-plough, ſeems to be one of the principal hindrances to the new huſbandry; and having now one, that I think may in ſome meaſure remove that difficulty, I intend to ſend a model of it to your public-ſpirited Society.

I cannot conclude, without acknowledging the favourable reception you have been pleaſed to give to my former letters, and am,

GENTLEMEN,

Your obliged and moſt humble ſervant,

Dec. 12, 1765. E. S.

* We are ſorry Mr. E. S. has omitted any part of what he might have otherwiſe thought proper to have written, on account of the length of his letter. We ſhould very readily have found room for what he mentions, as we cannot doubt, but that ſolid reaſonings on ſo intereſting a ſubject founded on *data* of unqueſtionable authority, cannot fail to be as acceptable to our readers, as important to the public. Whenever, therefore, he ſhall think proper to favour us with a ſupplement to this letter, in diſcuſſion of the topic he hints at, it will be gratefully received by us. E. O.

NUMBER V.

Further Remarks on the ſeveral Kinds of Burnet, and its Uſe in feeding Cattle and Sheep, in a Letter from Mago *to the Editors.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS the Reverend Mr. Comber does not appear to be ſo angry with me now, as he was ſome time ago, when he would account only *to you*, for what he had ſaid on the ſubject of burnet; and as he ſeems to be got, where I plainly pointed to him he *was*, by my letter, Vol. IV. p. 227, ſo I ſhall now readily give him, and his northern friends, all the aſſiſtance I can, to help them out of their preſent difficulties: and in order to the doing of this, I muſt refer to my letters, p. 227 and 313, which I wiſh Mr. Comber would read once more, perhaps he will find them more important than he thought they were at firſt. In p. 228 he will ſee I then informed him, *the only point in diſpute was, whether the cattle would eat it or not; and if they would, whether it was found to be nouriſhing food:* and in p. 229, I took the liberty of blaming the Society, for giving Roque fifty pounds, for cultivating burnet, *before it had been tried*, whether horſes, cows, and ſheep, would eat it *.

* The Society, on the firſt application with reſpect to burnet, had the ſtrongeſt aſſurances, particularly from the late worthy Mr. Wyche, that not only neat cattle and ſheep, but horſes, would eat burnet with great readineſs, and that it was a proper food for them. The bounty was not given to Mr. Roque till many months after it had been agitated there; and was not in conſideration only of his having cultivated this herb, but as a reaſonable return for his attention and trouble in giving information, and exhibiting the plant, and the method of culture of it, in a proper manner, to enable the Society to take meaſures for procuring adequate trials and experiments by the public, with relation to its general uſe. R.

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I wont say in what light these observations yet appear to Mr. Comber, but I am persuaded his good friend Mr. Cooke is prepared to admit their propriety; for my part, I had some doubts * as to the cattle eating it, from what I heard at that time, and, therefore, I said, it was the only, at least the only *material* point in dispute or doubt, and you, gentlemen, as editors, know, that I wrote you a letter, and begged you to communicate all that came to your hands, in regard to burnet, for we all knew it was to be raised from Roque's seed: and, therefore, I gave myself little concern about its botanical description, or distinction. I spoke of it as the garden pot-herb, and sallading burnet; and Mr. Comber surprized me much, by saying, in this Volume, p. 60, that the gardeners in the north *knew nothing* of its being an evergreen, a pot-herb, and sallad. I am much at a loss to account for their ignorance; for in the same number for July, p. 15, Sir James Caldwell says, "Roque bought all the bur-"net-seed he could get in London, *it having been used only in* "*sallads*;" and if Mr. Comber, and the northern gardeners, require further conviction, I refer them to the preceding paragraph, in which Sir James says, "he (Roque) took a hand-"ful of burnet and carried to his stables." From whence it is

* It is beyond all doubt, at present, that there are instances of particular places where the beasts obstinately refuse to eat burnet; and of others, where, though they do not wholly reject it, shew they yet have some dislike to it. On our examining into the facts, it appears by very late information, that this cannot be owing to a mixture of seed, made originally by Mr. Roque, as has been ingeniously imagined; though there was a difference in the kinds raised from it, as far as regards seminal variety. But it being certain that the cattle fed promiscuously on what Mr. Roque raised from this seed, and that where parcels of it have been divided, and sown in different places, the cattle eat what was raised in one of these places, and refused what was raised in others, it can be ascribed only to the effects which different soils have on this plant. It were to be wished, therefore, that a distinct and satisfactory account of the attendant circumstances of all such places were obtained, that by comparing them it might be distinguished, where burnet could be advantageously cultivated, and where not, which seems all that is now wanting. R.

plain, it was then growing and could *only* grow in *his* garden as a pot-herb or ſallad.

At preſent I have a very good opinion of Mr. Comber's head: and from the manner in which he takes the freedom I may uſe in this letter, I ſhall be able to judge of his heart. Thus much, therefore, for myſelf; and dropping all reſentment for the indelicate manner in which he has heretofore treated me, I proceed with the olive-branch in my hand, and good-will in my heart, to acquaint him what further knowledge I have acquired, in regard to this new graſs.

In the ſpring 1763, I firſt heard that burnet might be cultivated as a graſs for cattle; in July 1764, I ſowed a piece of ground with five pounds of Roque's burnet-ſeed; in October following I planted out two acres of light hot land, with my young plants, as mentioned in my letter, p. 229; in March laſt I planted two acres more, which compleated a field of four acres; every one knows that laſt ſummer was one of the worſt that could be for a young plantation, however my plants all ſtood it out, without any aſſiſtance of water, and were, during the violence of the drought, of a moſt beautiful verdure: I cannot ſay the growth was very great, but weeds were very troubleſome; however, I kept them down, and the plants ſtood over for ſeed, of which I collected about one hundred and ſixty pounds; it was all picked by hand; for as Mr. Comber juſtly obſerves, much of the ſeed is loſt by mowing; for when ripe, the leaſt wind ſhakes it out; however, a very large quantity may be got by mowing; Roque mowed his this year and laſt; I ſaw his men thraſhing it in the field, and they told me there was very near, if not quite, five quarters of ſeed *per* acre; as ſoon as I had collected what ſeed I wanted, I mowed part, and then turned four cows and two horſes into the field; I obſerved the cows eat very freely, and that they preferred the lower part of the plant, as being moſt graſs or leafy; the horſes eat down the ſtalks, and all without any diſtinction; though I obſerved the horſes did not ſeem to like it at firſt ſo much as the cows. What I mowed being about half made into hay, was carri-

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ed to the loft; and my coach-horſes lived upon it near a month; in a day or two they took to it very well, and my ſervants were convinced they throve much with it. From hence, I was ſatisfied, that horſes and cows *would* eat it; and as to the effect it had upon the cows, I muſt tell you, that after they had been two or three days in the burnet, my wife deſired to know where the cows were feeding, for ſhe obſerved a finer flavour in the butter and cream than uſual; indeed, I had obſerved it myſelf, but would not mention it till I had ſeen if it was noticed by others.

A certain gentleman in Middleſex, who I have the pleaſure of being acquainted with, endeared to his country by every inſtance of military ſkill and bravery, who notwithſtanding his high rank in the army, ſpends much of his time in improvements in agriculture, employing his ſword as a plough-ſhare, though I cannot ſay his ſpear as a pruning hook. This gentleman alſo was fearful, that cattle would not eat burnet; I aſſured him they would; ſtill he had ſome doubts; however, this ſummer he ſent me word, that his doubts were removed, and he was become a convert, for that his cows had broke in three times upon his burnet, which was ſtanding for ſeed, and eat very heartily of it. This account was attended with ſome particular circumſtances, which ſhowed that the cows were very fond of it.

Burnet-haulm, for I think it may be more properly called by that name than hay, after it has been thraſhed for ſeed, Mr. Roque has for ſome time paſt cut into chaff, and ſells at a very good price; and I have no doubt of its being a very hearty food. But I can no more agree with Mr. Lewis, than I could with Roque, in calling this haulm fine hay; but if cut in bloom, as I adviſed, Vol. IV. p. 314, I admit it will then be good hay: Mr. Lewis ſays it runs down in a ſpill ſix or eight inches; laſt autum I ſaw my gardener digging up a bed of burnet, when I obſerved the roots were very numerous, ſtrong, and ſome of them near two feet deep; this burnet was then about five years old.

Being ſatisfied that cattle would eat burnet, I determined to have ſome in broad-caſt; and therefore, the oats be-

ing carted off a field of twelve acres, the land mere gravel, I ordered it to be ploughed directly: and the 26th of laſt Auguſt, it was ſown with the 160lb. of ſeed before mentioned. The ſeaſon being very hot, and no rain till the 18th of September, it did not appear till the 28th of that month; and being ſo late in the year, it has made but ſmall progreſs; however, there ſeems to be a pretty good crop; and I intend, as ſoon as it has puſhed up a little in the ſpring, to give it a good harrowing, in order to deſtroy or check the weeds: I do not perceive that harrowing hurts either burnet or lucern; I uſe common harrows, ſo does Roque; that, he mentions, is quite needleſs: I obſerve, when his lucern is very foul, he uſes large ox-harrows.

Burnet will rarely make a mowing-crop the firſt year; and, therefore, I think it may be ſown with propriety with barley or oats; and after the corn has been taken off about a fortnight, it ſhould be well harrowed, or, which I think a better way, turn down the ſtubble, and ſow it, if it can be done in Auguſt; the ſooner the better. I have all along known, that Roque's burnet was of two kinds, which are well repreſented by figure 2 and 3, Plate I. Vol. V. No. II. is the green or moſt graſſy ſort, and Fig. III. the moſt ſtalky: whence I have little doubt of Mr. Cooke's being able to convince Mr Comber, that the wild burnet keeps green all the winter; and, further, I am inclined to think Mr. Comber will find, what he calls his burnet, No. VII. to be the ſame as Roque's, No. II. the difference in Roque's burnet, I apprehend, was owing to his collecting his ſeed, at firſt, from different ſeed-ſhops; and, therefore, recommend it to gentlemen, who intend to cultivate this graſs, to ſave the ſeed from II. or the green ſort; for III. is of a much deeper colour, as well as more ſtalky and ſtiff: and had Mr. Comber read my ſecond letter with attention, he would not have been ſo much ſurprized at what the *old-faſhioned farmer* ſays of its being *ſtalky* or *ſtiff*. For he will find that, p. 314, I ſaid, "burnet, when left to ſeed, grows "very *ſtrong* or *ſticky*;" and, I preſume, this gentleman's

was

was nearly in this ſtate as to ripeneſs; I, therefore, repeat it again, let it be cut in bloom. In p. 251, of your laſt Number, Mr. Comber tells us, "ſheep appear to be very "fond of the wild burnet, No. VII. for having been "watched on the ground where it grows, ſince he wrote "laſt, they have not left *one ſingle head of it*, but have eat "the leaf cloſe to the ground, juſt as they eat down the "fineſt ſpecies of the trefoil."——And in p. 300, Mr. Comber, from his friend Mr. Cooke's gardener, tells us, "that ſheep, being turned into the burnet-field, fed upon "the hedges and graſs-walks, *but would not meddle with the* "*burnet.*" Theſe different accounts ſurprized me much; and being very deſirous of knowing how the fact ſtood, I ordered a ſervant to go directly to a neighbouring farmer, for a flock of ſheep: and having a friend with me, we followed the ſheep to the field before-mentioned, of four acres; the conſequence was, that the ſheep fell upon the burnet very greedily, and ſoon convinced us that it would be very proper to ſend them home again; which was accordingly done, as I had laid up the field for my cows in the ſpring.

Mr. Comber has certainly the pen of a ready writer; but he has been ſo voluminous on the ſubject of burnet, that he has wrote himſelf into no little confuſion: at the beginning, when every one was buſy in cultivating burnet, in order to know its uſes, Mr. Comber began a diſpute with Mr. Mills about its botanical name; and now that many gentlemen, as Dr. Lamb, Mr. Lewis, the Kentiſhman, that amiable gentleman the old *Eſſex farmer*, &c. are convinced of the benefit of cultivating it, Mr. Comber is amuſing himſelf with telling us, p. 298, that it has been aſſerted, that Roque took the hint of cultivating burnet from the wild burnet *about London* keeping green all the winter, and yet, in the next page, he ſays, it is evident Roque has raiſed his burnet from the wild ſort, *that grows about Garton in Yorkſhire:* now neither of theſe are true; but true or falſe, they are no way to the point before us; and, therefore, all the remark I ſhall make on them, is, that they appear as contradictions, and want a little *correction.*

I ſhall

I ſhall now conclude with earneſtly intreating; and I beg that you, gentlemen, will join * with me in intreating every gentleman, who has cultivated burnet, that they will all favour the public, in your *next Number*, with a full and impartial account of their ſucceſs. I ſhould be glad, that each would ſay what cattle eat it, which they find prefer it moſt, and what conſequences have followed from their eating it. The gentlemen I now particularly call upon, are Dr. Lamb, Mr. Lewis, the Kentiſhman, F. R. and A. B. (in regard to the ſucceſs which Lord Northington had at the Grange) with every other gentleman who has cultivated burnet. The reaſon of my deſiring that theſe accounts may all appear in your next number, if poſſible, muſt be obvious; in the mean time I would adviſe Mr. Comber and his northern friend, to be patient, not to determine raſhly, or reaſon too much, on a matter that *muſt*, after all, *depend on ſimple facts*.

I am, GENTLEMEN,

Dec. 13, 1765. Your moſt humble ſervant,

MAGO.

P. S. I am very glad that Mr Comber has employed his thoughts in improving the five-coultered, or, as he with much propriety calls it, the *manure-plough*. I ſhall be very glad to find that his is found, from experience, the moſt uſeful machine; for I am always happy when any attempt of mine to ſerve the public calls forth the pen of a gentleman of greater abilities.

* We agree entirely with Mago, in his opinion, that the way to ſettle this important point is, to take a great latitude of information from thoſe gentlemen, who have now cultivated this plant, long enough to have gained a competent knowledge of its qualities and effects; and if we are favoured with ſuch accounts, we will either inſert them at large, or, if too voluminous, abridge them, ſo that the whole may come properly before the public. O.

NUMBER VI.

Anſwer to the Queries, in a Letter from Mechanicus, *inſerted in* No. 26. Vol. V. *relating to the Management of his Farm, and the Manner of his laying down ſome Land in Graſs.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN your *Muſeum* for November, I read the queries relative to ſome particular land, *&c.* ſigned *Mechanicus*, and dated from Stafford: as they ſeemed to me the queries of a perſon who really wanted the information he deſired, I could not help giving them ſome kind of anſwer, and wiſh it may be of ſervice to him, in caſe you will favour this with a place in your next publication.

Mechanicus ſays, he would lay his land down with graſs, and that it is naturally a wet ſoil. The method I would adviſe him to purſue is, to gather a ſufficient quantity of clean graſs-ſeed by hand, and ſow it in drills, about five or ſix inches apart. This ſhould be done in the autumn, about the beginning of September, or ſooner, if the ſeaſon is moiſt. It muſt be hoed, and kept quite clean from weeds, the ſpring and ſummer following; and when they are ripe, they ſhould be gathered or reaped, and threſhed out, fit for ſowing.

In the mean time, he ſhould get his land as clear of weeds as poſſible; for which purpoſe, if it is not foul, he may ſow a crop of beans in drills, which muſt be kept horſe-hoed, as well as hoed by hand, during the ſummer. When the beans are off, and the land clean, he may plow it up, and ſling in his graſs-ſeed, after it is harrowed down, and then harrow it again; and if the ground works in large clods, it will require a roll to be run over it, both before and after the ſowing.

But I ſhould recommend it, as the beſt huſbandry, to put his ſeed in by drills, which will give him the oppor-

tunity of hoeing it the firſt ſummer; and will be of great advantage in the end, though certainly more expence at firſt. If he takes the latter method, a leſs quantity of ſeed will do; as I myſelf have ſown in very near two acres and a half of land, not more than a buſhel of clean ſeed, and I believe, if my workmen had been uſed to the work, it would have gone farther, for they ſowed it rather too thick.

From his account of his ſoil, I ſhould imagine, that the meadow fox-tail, creſted dog's-tail, vernal, and common poa-graſſes, would ſucceed very well; and they are all excellent ſorts. But for his knowledge of them, I muſt refer him to Mr. Stillingfleet's obſervations on graſſes, in his Miſcellaneous tracts.

Though I have mentioned his ſowing a crop of beans, I ſhould not recommend that, unleſs his land is firſt very clean. The beſt way would undoubtedly be, to make a good ſummer fallow, and to ſow the ſeeds in autumn upon that. This would be more expence, but he may depend upon a better crop of graſs. He may take his own time for ſowing it; and may likewiſe be ſure of having no weeds to over-run it the firſt year.

As to his queries about marling his ground, I believe, nobody can give a proper anſwer to, without having ſeen the land. But I apprehend, if it has not been quite exhauſted with former crops and weeds, a ſummer fallow, well made, would intirely anſwer his end, and at the ſame time greatly lighten the ground. I would alſo adviſe him to ſprinkle a little Dutch clover-ſeed over his ground the ſpring following; that is, after ſowing the graſs-ſeeds, and to do it in a moiſt time. Timothy-graſs, I am not much acquainted with; but, from what I can learn of it, I do not ſuppoſe it has any ſuperior qualities to moſt other ſorts. It is, I believe, nothing but the cat's-tail-graſs, whatever Mr. Roque may ſay of it, in order to ſell the ſeed to greater advantage.

I am, GENTLEMEN,

Kent, Your conſtant reader,

Dec. 8, 1765. PHILOMATH.

NUM-

NUMBER VII.

Account of an Experiment to prove that Kine are fond of Burnet: And of an Improvement of the Method of making Bundles of Hay to be carried to Cattle.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

BY inserting my queries in your October and November *Museum*, I find that you have in some measure deviated from your original plan; which was only to exhibit such pieces that had a tendency to improvements: this favour, gentlemen, lays me under a double obligation; and is a distinguishing mark of your condescension and impartiality.

I should be extremely happy, if I could by any means contribute materials that would merit your regard, and be of advantage to the public. I yet have had but few opportunities, being involved in a constant hurry of business, that has hitherto allowed me but little leisure for contemplating the infinite variety of the vegetable creation, which will ever afford an ample field for displaying the talents of the most consummate genius, in their improvement and culture: a study worthy of the human faculties collectively, when considered as the absolute necessaries of life, and indispensibly connected with our existence.

I am now, gentlemen, arrived to such a situation of life that will give me frequent opportunities of making some (I hope) useful experiments; and if I am so happy as to succeed in my intended schemes of improvements, I perhaps may be a more acceptable contributer; and wish, most sincerely wish, that the *Museum Rusticum* may continue its existence, to give me an opportunity of gratefully returning you, and the public, some adequate reward for your very kind indulgence: but perhaps already too much of superfluous introduction; yes, the *Museum Rusticum* is de-

ſigned for nobler ends, than to be filled up with unavailing apologies, and contradictory altercations *; I could rather wiſh to ſee a friendly emulation in the pieces of every correſpondent, who have the honour to appear in ſo uſeful a collection of intereſting particulars.

Gentlemen, as I have been, ever ſince I was poſſeſſed of my little farm, and the *Muſeum Ruſticum*, very attentive to every uſeful improvement in huſbandry, and in particular, to burnet; and was fond to believe every report in its favour, eſpecially as it came recommended, ſeemingly, from gentlemen of fortune and integrity, who could have no other intention, by encouraging its culture, than the benefit and advantage of the public. This induced me, gentlemen, to deſire (in a note to my letter in your laſt October and November *Muſeum*) that Mr. Roque would ſave me a few ounces of every ſpecies of graſs-ſeeds he cultivates, the better, by perſonal cultivation, to aſcertain their real and comparative merit, with other kinds that are more common, and tranſmit to you the particulars of my ſucceſs.

I have obſerved with real concern, that Mr. Roque's integrity is called in queſtion; and I think that his character hath not had that equitable regard paid to it, which yet, upon a further examination, it will be proved to deſerve.

* We heartily join with Mechanicus in this wiſh; and ſhould take it as a favour of ſeveral of our correſpondents, that they would let their remarks be confined to the abſtracted ſubject, and only produce arguments in ſupport, or for the refutation of the opinions or doctrines they eſpouſe, or oppoſe, without reflections or criticiſms on the manner of writing or perſonal character or conduct of each other. The complaints of many of our readers on this ſcore, and the concern we ourſelves are under, to ſee our work made the vehicle of cenſure, and even reſentful expreſſions, oblige us to ſeek ſome remedy for this evil: and we rather chuſe to take notice of it on a general occaſion like this, than to have recourſe to the diſagreeable taſk of remonſtrances and reproofs to particulars; hoping this intimation will meet with proper notice from ſeveral gentlemen, whom we ſhould be extremely ſorry to diſoblige by a more particular explanation. R.

I was

I was greatly alarmed with the character that the Rev. Mr. Comber gives of Roque's burnet; and the more ſo, as I have always viewed him as a gentleman of fortune and integrity, and ſtrictly impartial, and above prejudice: and yet Mr. Comber affirms, that he has offered his burnet to a ſick foal, a colt, and to all his cows, and every one of them refuſed it; and even his hogs, who eat moſt kinds of vegetables, did not meddle with it. I have not the leaſt doubt but the above is ſtrictly true in every circumſtance; yet I am inclined to believe, that the burnet Mr. Comber mentions, is not the burnet of Roque, but of ſome other ſpecies, taken to be his by miſtake.

I am naturally led into this opinion by the following experiment which I made yeſterday: I was informed that a gentleman at Stafford had a little patch, in a field adjacent to the town, ſowed with burnet, by way of experiment. My curioſity being raiſed, and ſuſpended by the various and contradictory accounts of it, publiſhed in your *Muſeum*, determined me to go to Stafford, and enquire for the field where the burnet grew. I ſoon found the deſired curioſity, which was remarkably flouriſhing, conſidering the manner of its cultivation, which appeared quite neglected, the ground being covered with a multitude of weeds. I knew it to be burnet, from the drawings of it given in the *Muſeum*.

The ſoil being light and ſandy, I eaſily drew up with my hands half a ſcore of the plants, ſome of which had perpendicular roots of eighteen inches long, with a few horizontal fibres: but to be farther ſatisfied that I had got the real burnet, I immediately went to the gentleman's ſhop (being an apothecary) and aſked for a penny-worth of borax; at the ſame time I ſhewed him a ſmall burnet plant, and inquired of him the name of this curious plant: his anſwer was, Burnet. Without aſking me any further queſtions, he told me, he had a ſmall parcel growing, and that his horſe was very fond of it. I hope, gentlemen, you will pardon my unjuſtifiable method in procuring it; but, as I had little perſonal acquaintance with the gentleman, I deſpaired of getting any by more lawful means.

I am the more particular in my account, as burnet ſtands judicially condemned as an unfit member in the commonwealth of vegetables for paſturage: and Mr. Comber recites, that a gentleman of his acquaintance affirms, that "the recommendation of it is a groſs impoſition on "the public." Mr. Comber very ingenuouſly confeſſes, that he does not immediately acquieſce in it. Permit me, gentlemen, to beg a momentary reſpite for the unhappy convict, burnet; and ſuffer the under-mentioned fact to be fairly ſtated, and then, with the impartial public, I am well aſſured the character of the poor delinquent, in ſome meaſure, will be re-eſtabliſhed, at leaſt, ſo far, as to have another fair trial.

I returned immediately home, and went to a piece of land where I had four cows: however, I firſt waſhed my plants, as they might, I thought, have contracted ſomething diſagreeable to the cows, by drawing them out of the earth, and carriage. After this, I offered a burnet-plant to a cow, whom I knew to be remarkably nice: but to my great ſurprize, ſhe greedily ſnatched it from my hand, and eagerly devoured root and all; and before I was aware, ſhe faſtened on the plants I had in my other hand, which I intended for the other three; they alſo ſhewed the ſame eagerneſs, and eat them as greedily as the firſt.

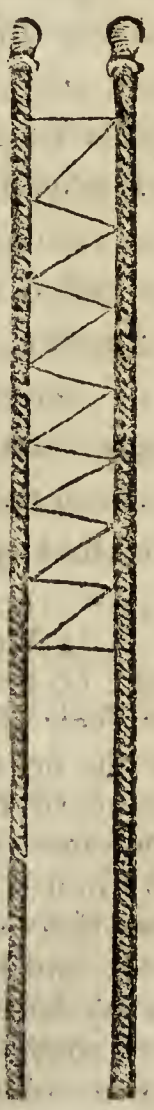
I leave you, gentlemen, and your correſpondents, to make what concluſions you judge proper; but be aſſured this repreſentation is ſimple truth, and abſolute fact *, and diveſted of the leaſt exaggeration. I ſincerely wiſh that

* As Mr. Comber, in your laſt Number, page 255, intimates, that no great ſtreſs, as to facts, can be laid upon the aſſertions of ſuch of your correſpondents that conceal their names; and in the next page, the ſame gentleman ſeems deſirous of having authentic certificates produced of cattle's liking burnet: this is therefore to aſſure Mr. Comber, that if it be of any conſequence to himſelf or the public, to know my name, by intimating in the *Muſeum* ſuch deſire, him or they ſhall be immedately ſatisfied, and have alſo authentic teſtimonials of the fact, as I have in my letter affirmed; and if it were convenient or agreeable to the above-mentioned gentlemen, I would ſend him a couple of burnet-plants of the ſame kind I made my experiment.

every

every contributer to your work would be as careful in repreſenting experiments, as I have been in this; for facts ſhould be the ultimate end of theoretical knowledge, and the baſis whereon we ſhould found our judgments; without which we ſhall be hurtful to ſociety, by miſleading others that might be better employed, in the fugitive chace of fanciful purſuits and unavailing ſpeculations.

Before I conclude, I muſt beg leave to recommend a ſmall invention of my own, but not without its utility. Hay being this year remarkably ſhort, conſequently very difficult to be bound up in bundles of ſufficient ſize to carry out as fodder for cows, &c. I have ſeen ſeveral miſcarriages by the hay ſlipping out of the cord, as ſervants have been conveying it into the fields, and have ſeen it ſtrewed about the ſtreet like refuſe upon a dunghill, which I think is a great pity, as it is this year ſo extreamly ſcarce. The method I have invented is this:



I procured two cords of equal length, made pliant and ſoft to prevent them twiſting; they need not be ſo ſtrong as a common foddering-cord, as they form a double bandage. I nailed them down upon a barn-floor, in a parallel direction, twenty-two inches aſunder: I got a ſmaller cord, and began at the ends of the greater cords, where I had faſtened nooſes of iron, for the greater facility of binding; the cords drawing much better through them, than through nooſes of cordage. I made the ſmall cord ſufficiently faſt, by putting it twice through the plaits of the thicker cord, about four inches below the nooſe, and faſtened it in the ſame manner to the other cord, four inches below the other nooſe. I then carried it back to the firſt cord, and faſtened it twelve inches below the place where I made the firſt faſtening, and ſo carried it on from cord to cord, in a zig-zag form, for about four feet; the remaining parts of my cords were unlaced for the drawing together of my bundle. You would be ſurprized with what facility

and

and neatneſs the ſhorteſt hay may be bound together with this cord, and carried to the intended place, without the leaſt loſs: a child may bind it together, as it does not require to be bound ſo tight, as in a ſingle cord; and but little care needful in placing the hay in it when ſpread upon the floor. In a word, when bound, it is incloſed as if it were in a net, the larger cords turning over the extream ends of the hay, and forms ſomething like a purſe. If you think this not a ſufficient explanation, I have annexed a drawing, but that may be added or omitted at your pleaſure, as I think the above deſcription ſufficiently plain. I wait impatiently for your next Number, and hope I ſhall not be diſappointed of receiving an anſwer * to my queries, through the good-nature of Mago, *&c.* I ſhould be glad, gentlemen, to be indulged with a place in your next Number, for I am much concerned for Mr. Roque, and his adopted burnet. I am, gentlemen, a friend to ſociety, ſo far as my abilities and influence can extend, and

Your obliged and grateful humble ſervant,

Near Stafford,
Dec. 8, 1765. MECHANICUS.

P. S. At the receipt of your laſt Number, I had almoſt finiſhed a letter that I intended for your collection, much of the nature of Agricola's. See No. L. of your laſt publication. But my intention is intirely precluded by his more maſterly and ingenious piece. I hope Agricola will not delay obliging the correſpondents of the *Muſeum Ruſticum* (to whom it cannot but be very acceptable) with thoſe pieces he mentions in the laſt paragraph of his very ſenſible letter.

* Mechanicus will find an anſwer to his queries in the article immediately preceding this, which is a letter from Philomath. We are very glad to have been the means of his obtaining what he deſired, and hope it will be ſatisfactory to him: and we are obliged to him for the promiſe he makes us of his future correſpondence; not doubting, but that, from his apparent ingenuity and earneſtneſs, he muſt ſucceed in making experiments and obſervations worthy being communicated to the public. O.

NUM-

NUMBER VIII.

Method of Propagation and Culture of the Scotch Fir, Spruce Fir, and Larch.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

THE following obſervations, founded on experience, induce me to ſend them to you, and if they will not take up the room of any thing more deſerving * a place in the *Muſeum Ruſticum*, you have leave to inſert them in your next volume of that entertaining ſerviceable work.

Obſervations on the Propagation and Culture of Scotch and Spruce Firs.

The methods that appear to me the quickeſt and beſt for raiſing a plantation of theſe ſpecies of firs, are to gather in February or March the largeſt and moſt compact cones of thrifty flouriſhing trees, not leſs than fourteen or ſixteen, nor more than twenty or twenty-five years growth. Trees of eight and ten years old, and often before they are that age, bear cones; but I am doubtful whether their ſeed be good. I know it is a remark of ſome ſenſible planters, that an early produce of cones is a ſign of weakneſs in the plant: and I ſhould neither chooſe the ſeeds of old declining plants, nor of young ſickly ones. If the cones be expoſed to the ſun a few days in a ſhallow deal or tin box (the latter of which I ſhould prefer, as it reflects the heat) they naturally expand, and the ſeed is eaſily obtained. The ſeed cannot be ſown too ſoon, and ſhould not be delayed

* The ſubject, as well as the intelligent and ſatisfactory method with which it is treated, renders this letter highly deſerving a place in our *Muſeum*; and we ſhall be greatly obliged to the gentleman, from whom it came, for any future favours of a like kind. R.

longer than the beginning of May. I think it beſt to ſow the ſeed in freſh prepared drills, about a foot aſunder, as near the ſurface as poſſible, and for the plants to continue two years on the ſeed-bed, free from weeds. In April 1754, a gentleman in Norfolk, ſix miles ſouth of Norwich, began with two-year old plants, thus raiſed, to plant a very barren, mountainous, gravelly piece of land, of fifteen acres, obſerving to place the ſpruce firs in the valleys and ſouthern expoſures. The firſt and ſecond years, for he was four or five years before he could raiſe plants ſufficient to compleat it, he did not begin to plant till the eighth of April; the other years in February; but as the plants of the two firſt years planting are better, bating the difference of age, I am inclined to think April the propereſt month for tranſplanting them. The plants in general, of the whole plantation, are now in a fine growing ſtate, particularly thoſe of the firſt year's planting, and from the following dimenſions of a ſcore of each ſort, I judge the Scotch firs to be, at a medium, about ſixteen feet ten inches high, with ſtems ſixteen inches in circumference, at two feet from the ground; and the ſpruce firs thirteen feet eight inches high, with ſtems nine inches in circumference, at two feet from the ground; but I am convinced their growth has been greatly forwarded, by conſtant howing and keeping the ground, which was a clean ſummerlay when planted, looſe and free from weeds.

Reſpective

Reſpective heights of twenty Scotch furs, and their circumferences, at two feet from the ground.

	Height. Feet.	In.	Circumf. Inches.
1	17	8	17
2	18		20
3	19	6	20
4	11		9
5	13	9	16
6	14	4	15
7	18	10	17
8	20		20
9	12	6	13
10	20	9	19
11	12	9	14
12	17	9	19
13	20	4	19
14	15		14
15	20	5	20
16	14	6	18
17	17		19
18	17	10	17
19	23	6	23
20	11	6	10
	336	11	339

Reſpective heights of twenty ſpruce furs, and their circumferences, at two feet from the ground.

	Height. Feet.	In.	Circumf. Inches.
	19	4	17
	14	7	12
	13		10
	12		7
	11	5	7
	11	6	6
	8	4	5
	13	6	8
	11		6
	16	3	10
	20	6	19
	20	9	14
	16	2	10
	9	6	9
	21		14
	21	4	22
	10		6
	8	6	5
	7		6
	9		5
	274	8	198

Three hundred and thirty-ſix feet eleven inches, the total height of the Scotch firs, I meaſured, divided by twenty, is ſixteen feet ten inches; and three hundred and thirty-nine inches, their total circumference, at two feet from the ground, divided by twenty, is ſixteen inches, or one foot four inches: two hundred and ſeventy-four feet eight inches, the total height of the ſpruce firs, I meaſured, divided likewiſe by twenty, is thirteen feet eight inches; and one

hundred and ninety-eight inches, their total circumference, at two feet from the ground, divided in like manner, is nine inches. They were all planted at four feet diſtance, though thoſe of the two firſt years planting are now reduced to eight, twelve, and, where they are moſt vigorous, to ſixteen feet. It is undoubtedly right to plant them thick at firſt, and to thin them by degrees, obſerving to take away the ſickly, deformed, double-headed ones, and to ſave more than ſufficient to grow to timber of thoſe that are flouriſhing and upright; for their leading ſhoots are, by high winds, accidental blights, or birds lighting upon them, when young and tender, frequently broke off, and in dry ſummers they are liable to be damaged by inſects; beſides, as the method of trimming, I ſhould prefer, is that of cutting off the branches as they die: another main reaſon for leaving a ſuperfluous number, is, becauſe confinement, and want of air, are the means of killing the lower boughs; but notwithſtanding I moſt approve this way of pruning, I believe, when the plants are about ten or a dozen years old, a ſingle tire of branches may every November be cut off about ſix inches from the ſtem, and cloſe to it the following year, till they be trimmed fourteen, ſixteen, or eighteen feet, or higher, if the planter likes it. When a tree gets two leading ſhoots, heſitation about cutting off the worſt is needleſs; nor ſhould I ever ſcruple taking off a lateral branch that diſfigures the tree, eſpecially near the bottom. Though I ſhould always like an exceſs of good plants, for the reaſons afore-mentioned, till they be at the diſtance of about ſixteen or twenty feet from each other (as they may happen to ſtand) at which diſtances I think they may be left to run to timber, yet they ſhould never be ſuffered near enough to hinder each other's growth; and thoſe parts of any plantation, where the plants are moſt vigorous and thriving, will require and well deſerve the attention of the planter, to guard againſt that inconvenience, by a timely cautious thinning. Another rule to be obſerved in thinning a plantation, is, to leave the plants thick on the outſide, for though they are generally forked and unſightly,

ly, they are a neceſſary defence to the inſide plants; and in open hilly countries the planter would do well to follow the direction of Mr. Marſham, who in his very accurate and judicious obſervations on the growth of trees, publiſhed in the Philoſophical Tranſactions, Vol. LI. No. II. p. 7. ſays, "woods of fir ſhould be guarded with an out-line of "birch and beech, to break the force of ſtrong winds."

I meant to have limited my letter to the Scotch and ſpruce firs, but as five hundred two-year old larches were, in February 1757, planted in the moſt expoſed northern part of the aforementioned plantation, are very vigorous, and from the mean height of half a ſcore I meaſured, I look upon them to be, one with another, about ſixteen feet high, and their ſtems twelve inches in circumference, at two feet from the earth. I muſt take notice that a dry gravelly ſoil ſeems proper for them.

To conclude, regularity, in the already thinned parts of this plantation is broke as much as poſſible, it being thought more pleaſing to the eye, and the plants leſs apt to be damaged by boiſterous winds.

I am, with much eſteem,

GENTLEMEN,

June 21, 1765. Your moſt obedient ſervant,

R. C.

P. S. As theſe heights and circumferences are reduced from menſurations, taken before the 24th of June 1765 (conſequently before the ſhoots of the year 1765 are perfected) it may fairly be ſuppoſed, that at the end of the year, the Scotch firs will be about four or ſix inches, the ſpruce firs, which do not begin to ſhoot ſo early, about ſix or eight inches, and the larches, which are quicker growers than either, and continue ſhooting in length till near Michaelmas, about eight or ten inches higher than they appear to be by theſe dimenſions.

NUMBER IX.

Account of the Nature, Culture and Uſe of the Turnep-Cabbage; explaining the Reaſons for the Premium offered by the Society for the Encouragement of Arts for that Article: In a Letter from Agricola.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN my laſt letter to you, I promiſed the ſubject of my next ſhould be the conſideration of a point of high importance to the public. What I then meant was, *Obſervations on the Practicability and Means of the Production of Silk in Great-Britain:* a matter which, under the preſent circumſtances of our commerce, could it be attained, would be of the greateſt moment; and on which, it is perhaps poſſible to throw ſome lights at preſent that may have very intereſting conſequences. But the Society for the Encouragement of Arts, *&c.* having publiſhed a premium for the *culture of turnep-cabbage*, which conſequently renders that an object of more immediate attention, I ſhall poſtpone the other; and here give the beſt account I can of this plant, as far as relates to the intention of the Society in that premium: as I conceive it will aid their views; and gratify the curioſity of many of your readers, to be made acquainted with the material particulars relative to this new object.

The *turnep-cabbage* is ſo called, becauſe the ſtalk, at ſome diſtance from the ground, after riſing of the uſual thickneſs, and in the manner of thoſe of other cabbages, enlarges ſuddenly to ſuch a degree, that it forms a knob of the magnitude of a common turnep; of which, likewiſe, it has ſometimes the figure, though generally it is more oblong.

By this peculiar formation of the ſtalk, or production of the turnep-like knob, together with its being perennial, this ſpecies

ſpecies of cabbage is diſtinguiſhed from all others. From the top of this turnep riſe a number of leaves, of a greeniſh-red, or ſometimes greeniſh-purple colour; which anſwer to the radical leaves in other plants. They do not, though this plant is truly of the cabbage kind, ever cloſe together, and form a compact globular or oblong maſs, as in the common ſpecies; but keep their erect growth, or turn outwards.

From among theſe leaves ſpring a number of other ſtalks, of which, thoſe that are nearer the extremity, branch, and ſend out flower ſtalks, ſpreading horizontally; and thoſe that are more in the center, grow erect, and without branches. On theſe ſtalks are leaves, ſpringing out alternately, and of the ſame colour with the others. The flowers are ſmall and yellow, and ſucceeded by long cods, full of ſeed, of the ſize of that of muſtard, and a light-brown colour. It may be juſtly doubted, whether or no this plant be originally a native of our country; though it is at preſent found growing wild in ſome places near Dover. But, from its general character, which does not agree with the indigenous plants of the ſame kind; from its being unknown to the earlier botanic writers, or, at moſt, known only in the view of an exotic; and from its being now to be met with wild, only in the one place mentioned, it is moſt probable, that what is there found, was the produce of ſeed conveyed originally thither by ſome accident; and which has ſince propagated itſelf, and ſpread ſpontaneouſly, as it eaſily might, from its perennial nature and extreme hardineſs. It is frequently cultivated in gardens, where there are collections of vegetables: but, for the moſt part, rather as a curious than an eſculent plant. Though certainly, the turnep, or knob, is at leaſt as wholeſome as either any turnep or cabbage, and is much liked by ſome; and the leaves are alſo thought good by others; but in general, both are ſaid to be ſtrong, and ſeldom admitted to the table with us. This plant, however, affords ſprouts, which, after they have undergone the action of a ſtrong froſt, are exceeding good; and may conſequently be had at the

time

time when all others fail. The lying in very ſmall room, proportionably to the quantity of ſolid ſubſtance, and the keeping good much longer than any other ſort of vegetable of a ſimilar nature, are qualities, moreover, which fit this plant in a moſt peculiar manner for the uſe of ſeamen, as is ingeniouſly remarked by Mr. Baker, in his report to the Dublin Society: but of this I ſhall take more particular notice below.

It appears from Gerard, that there were, in his time, two kinds of this plant; one of which he calls *Caulorapum rotundum*, or round rape-cole; and the other, *Caulorapum longum*, or long rape-cole. The difference of theſe two kinds conſiſted only in the form of the knob or turnep, as is expreſſed by the names themſelves; and in the long kind's ſhooting forth ſmooth indented leaves from the turnep part, which leaves the round kind wanted. I have here ſent you a ſketch of theſe two kinds, according to the prints Gerard has exhibited of them; and they may ſerve alſo to give ſome idea of the general figure of the plant, to thoſe who have never met with it.

I have not however ſeen in any garden, nor find any traces in the late writers, of more than one kind of this plant; ſo that if the *round* and *long* kinds, mentioned in this manner by Gerard, were really different ſpecies, the long is now loſt. But it ſeems more probable, that this was only a degeneracy of the plant, by means of the *farina* of the common kinds of cabbage; as the deviation from the round knob towards the plain ſtalk, and the breaking out of the leaves from it ſeem to indicate.

If there really were two original kinds, or this difference aroſe from a permanent ſeminal variation, it would merit attention under the preſent circumſtances to recover them; ſince it frequently happens in correſpondent caſes, that where there are two allied ſpecies, the one has qualities which fits it to a particular purpoſe in a very ſuperior degree to the other. This plant was rare in Gerard's time in our country; as he mentions his having the ſeed from Spain: and indeed it was ſo little known, that he ſays it

Caulorapum rotundum, Round Rape-Cole, or Turnep-Cabbage.

is to be ſown and ſet as cucumbers and melons; and that it was then accounted a dainty meat. It did not, however, make its way to the table in common, or even as a curioſity in gardens, much more at that time than ſince. For Parkinſon, who wrote after Gerard, and enumerates many more ſpecies of cabbage than him, does not take the leaſt

Caulorapum longum, Long Rape-Cole, or Long Turnep-Cabbage.

notice of it. Tournefort, and moſt of the later writers, mention this plant under the various names of *Braſſica congylodes*, *Braſſica caule rapum gerens*, *Braſſica cauleſcente orbiculari carnoſo foliis ſeſſilibus*, *Braſſica radici napiformi*. But they do little more with regard to it, than give the name and deſcription. Miller, in his Gardener's Dictionary, ſays, this kind of cabbage "never varies, for I have cultivated

" it many years, and have not found it to alter. It grows " naturally on the ſea-ſide, near Dover. It hath a pe- " rennial branching ſtalk, in which it differs from all " other ſpecies. I have cultivated it theſe three or four " years, and have eaten the young ſhoots, after they have " been much frozen, when they were very ſweet and good; " but at other times they are very ſtrong and ſtringy. In " very ſevere winters, where the other ſorts are deſtroyed, " this is a very neceſſary plant, for the moſt ſevere froſts " do not injure it."

Till lately we ſee, therefore, this plant was only conſidered, either as a kind of curioſity in botanic, or other gardens, where there were collections of different kinds of plants, or as an eſculent herb: but, in this latter view, it ſeems not to have acquired any great reputation, as it is ſo ſeldom, even notwithſtanding Miller's recommendation, met with on the table here; though I am well informed, that in ſome of the factories in the Eaſt-Indies, it has been cultivated from European ſeed, and is much liked.

The firſt public notice I find taken of this plant, in the preſent view of cultivating it for feeding cattle, is in a pamphlet publiſhed by the late Mr. North, gardener, near Lambeth, who ſpeaks of it, under the article of cabbage; of which he ſays, " There are four ſpecies that may be " cultivated to great advantage for cattle; to wit, the " *white cabbage*, the *hardy curled Savoy cabbage*, the *turnep-* " *cabbage*, and the *green curled cabbage*." When he comes to treat particularly of the turnep-cabbage, he thus expreſſes himſelf: " The turnep-cabbage is one of the hardieſt " roots that grow; and I dare affirm, might be propagated " to great advantage for feeding ſheep, *&c.* For in the " moſt ſevere winter that I can remember, when cabbages, " ſavoys, turneps, *&c.* have all been demoliſhed by the " extremity of the weather, the turnep-cabbages have not " been hurt. The turnep part grows all above ground, " which is crowned with many large ſmooth leaves, like " thoſe of the red cabbage, but which grow open like the " tops of turneps. They are a very ſolid juicy root, and do

"not grow ſpongy when they are old, as turneps do. "The tops may be cut off, and given to ſheep, &c. in "the ſpring, and the roots laid by in an out-houſe to "feed them in April and May, when no other roots can "be had. Sheep are ſo fond of theſe roots, that they will "leave the beſt turneps for them. When they are given "to ſheep, they ſhould be cut to pieces; but they will "eat them faſt enough, tops and bottoms, as they are "growing in the fields. After Michaelmas, when turnep-"cabbages have their full growth, they will weigh from "four to eight pounds a root."

It may be proper here to caution againſt a miſconception, from the inaccuracy of an expreſſion of Mr. North's, in calling the turnep-like part of this plant, a root: for it is no more than an enlargement of the ſtalk in that part; being, when the plants are large, ſeveral inches above the ground. It is proper to obſerve likewiſe, that Mr. North has under-rated the weight of theſe plants; it appearing, by Mr. Baker's account, that ſome weigh fourteen or fifteen pounds. This is the firſt notice I find in any publiſhed work, of this plant's being conſidered as proper for feeding cattle: but it appears in the minutes of the Society's books, that ſome little time before the publication of this pamphlet, on the enquiry ſet on foot by the late Mr. Wych, concerning a proper food for cattle in hard winters, this plant, together with the Chineſe or white vetch, and the Syberian medicago, were propoſed to the Committee of Agriculture for their conſideration, by a gentleman well known to that Society; and this plant was particularly recommended for its hardineſs in the ground, its quality of not rotting, though long kept, its nutritive property, and the fondneſs which cattle ſhew for it, when offered to them as food.

Mr. Baker, nevertheleſs, whoſe report on this ſubject to the Dublin Society you publiſhed in your October and November *Muſeum*, No. 52, Vol. V. muſt have the honour of being the firſt who really introduced this plant into uſe, as an article of huſbandry. For it was on the authority of his judicious experiments, related in that report,

report, the ſame gentleman, who formerly recommended the turnep-cabbage, as above-mentioned, to the London Society, induced them now to offer a premium for its culture: and there is no one object of a ſimilar nature, hitherto taken into conſideration, either by this Society, or that of Dublin, which bids fairer for being of great public utility: as this plant ſeems to anſwer all the ends of what was ſought for, with ſo much pains and attention, in the reſearch ſet on foot by Mr. Wych, after a proper *winter pabulum* (as it was called by him) for cattle in ſcarce winters. I, for the more ſatisfactory illuſtration of this in practice, muſt refer to the particulars of Mr. Baker's report, which perfectly verify what Mr. North, and the gentleman above-mentioned, delivered in theory.

The turnep-cabbage may be cultivated in the manner of other cabbages; of which the particulars may be ſeen in Miller's Dictionary. But the ſucceſs Mr. Baker had with his method, particularly in relation to the magnitude of the turnep, which ſeems to go far beyond Mr. North's notion, recommends ſtrongly the trial of that manner; except that, as he properly remarks, where the plants are raiſed in the ſpring, the ſeed ſhould be ſown in the very beginning of March; the plantlings, tranſplanted to a proper cloſe bed, as ſoon as they are ſufficiently ſtrong to bear it; and the final tranſplantation of them out into the field at the diſtances in which they are to grow, ſhould not be deferred later than the beginning of June. This would both give more time for the plants to become large before winter, and a better chance to avoid a total want of rain, after tranſplanting; the only accident, except the deſtruction by caterpillars, or other inſects, to which this kind of crop is ſubject; as the plants bid defiance, after they have firmly taken root, to all inclemencies of weather, either with reſpect to cold, wet, or drought.

It may be inferred from the above particulars, which, as we ſee, ſtand on unqueſtionable authority, that, conſidered as an article of huſbandry, this plant muſt be a very valuable acquiſition; as it is of eaſy culture, and as little

ſubject

ſubject to fail by accidents, as any crop whatever: as the produce, with reſpect to quantity, is likely to prove, under favourable circumſtances, thirty-five or thirty-ſix tons per acre, as appears from Mr. Baker's account: as its produce greatly preferable either to turneps or other cabbages; being much more nutritious, and leſs watery and cold; a fault in the common turneps: as it may be depended on in the moſt rigorous and ſevere ſeaſon, when every thing elſe but dry fodder fails, and may be taken from the place of growth, in caſe of exigence, whenever the ground is not covered with a very deep ſnow: and as it is much liked by neat cattle, ſheep, deer, and hogs; agrees perfectly well with all of them; and fattens them in the moſt profitable manner. This is certainly very ſufficient ground of recommendation, as an object of premium, to the London Society; and it is hoped, will be ſo, as a ſubject of experiment and trial to thoſe gentlemen, or more liberal kind of farmers, who attempt improvements in huſbandry.

I have thus endeavoured to give all the light I can into the nature of this plant, conſidered as an article of huſbandry: but before I end this letter, I beg leave to ſubjoin a few words reſpecting it in another view, of ſuch importance to a particular ſet of men, whoſe health and ſafety manifold reaſons recommend to the care of the public, as makes it merit a very ſerious conſideration. What I allude to is, the intimation given by Mr. Baker, of the probability that this plant might be rendered extremely ſerviceable to ſeamen in long voyages. As there can be no doubt of the juſt foundation of this opinion, it ought to be kept in ſight as much as poſſible, till the matter be realized in practice. The putrid ſcurvy, ariſing from the eating ſalt proviſions, is the great bane of a ſeafaring life. The numbers diſabled or carried off by it, particularly in time of war, are almoſt incredible; and, if we conſider the public value of lives ſo loſt, both with reſpect to the national power and expence, policy, as well as humanity, bids us liſten to every feaſible propoſal for mitigating this evil. The uſe of vegetables in the diet along with the ſalt-beef or pork, is

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well known to be one of the moſt effectual means of prevention of this diſeaſe: and indeed, it has been ſo well underſtood, that great quantities of cabbages, &c. have been ſent off to the fleets cruiſing in the bay, or elſewhere within reach, to the great relief and refreſhment of the men. But this ſpecies of cabbage, abounding more in the ſaccharine juice than the other kinds, would be a more efficacious preventive or palliative of the ſcurvy; and the ſolid compact texture of theſe turneps, which makes a conſiderable weight, lye in a ſmall compaſs, together with their repugnance to that putrefaction, to which other turneps, cabbages, &c. are quickly diſpoſed, renders it practicable to keep them on ſhipboard, in any climate, for many months; provided they be preſerved from the acceſs of any extraordinary degree of moiſture.

If this plant ſhould be, therefore, generally cultivated in the field-way, and conſequently produced at a very cheap rate, as Mr. Baker has ſhewn, that betwixt thirty and forty tons may be obtained by an eaſy method of culture, in one year, from one acre of ground, they might be purchaſed at a much cheaper rate than any other article of proviſion at preſent in uſe for the victualling ſhips.

This ſeems to be an object very well worth the conſideration of the India Company; as it might be a means of preventing that delay and ill ſucceſs of ſome voyages, which ariſe from the ſickneſs of the men; and it is attended with no difficulty, but what regards the ſtowage. For the plant being already cultivated in ſome of the factories in the Eaſt-Indies, where it ſucceeds as well as here, and conſequently might in all the others, as no climate or ſeaſon appears injurious to its growth, it might be procured at a proportionably cheap rate, as well for the ſupply of the homeward as outward bound ſhips: and indeed, conſidering the nature and ſtate of the proviſions on board ſhips returning from India, it would undoubtedly be peculiarly beneficial in that caſe.

I ſhall now conclude with one more obſervation. The Society have required, in the conditions on which they of-

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fer their premium for the culture of this plant, that an account ſhould be ſent by the candidates, of their reſpective method, ſucceſs, application, and other particulars relative to it. But as numbers of gentlemen, or farmers, may take up this matter without any concern with the premium, it would be very material, to the promoting the advantages that may accrue from the introduction of this new ſubject, if ſuch of them as meet with any extraordinary event, or practiſe any extraordinary method, would impart the particulars to you. And, indeed, thoſe who are candidates, may advance the views of the Society much, by doing the ſame: as the Society has at preſent no appropriated channel to communicate matters of this kind to the public, and only inſert them in journals that fall into few hands, and die with the day; which conſequently renders the publication rather an embarraſſment to them, than a benefit to the public.

I am, GENTLEMEN,

Your humble ſervant,

AGRICOLA.

NUMBER X.

Two Premiums offered by the Society for the Encouragement of Arts, &c. the one for a Machine for ſlicing Turneps; the other, for cultivating the Turnep-cabbage.

Premium for a Machine for ſlicing Turneps, now firſt eſtabliſhed by the Society for the Encouragement of Arts, &c.

FOR the beſt cheap machine for ſlicing turneps, in order to feed cattle, that will diſpatch large quantities with more eaſe and expedition, than by any method now practiſed, twenty pounds.

To be produced to the Society, on or before the firſt Tueſday in November 1766.

Premium

Premium for the Culture of Turnep-Cabbage, now first eſtabliſhed by the Society for the Encouragement of Arts, &c.

FOR raiſing and duly cultivating the turnep-cabbage, for the feeding cattle and ſheep, on the greateſt number of acres (not leſs than three); and giving an account of the ſoil, culture, time of taking up, produce, and their effects on cattle and ſheep fed with them, twenty pounds.

For the next greateſt number of acres (not leſs than two), fifteen pounds.

The certificates, agreeable to the above conditions, to be produced to the Society, on or before the third Saturday in March 1767.

The ſame premiums are continued for the year 1767; and the certificates are to be produced on or before the firſt Wedneſday in November 1768.

NUMBER XI.

Proceſs for making Pot-aſh, communicated by Mr. Doſſie, *to the Society for the Encouragement of Arts, &c. With Obſervations tending to illuſtrate the Queſtion, Whether the ſame could not be practiſed in Great-Britain with Advantage? In a Letter from him to the Editors.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN compliance with your deſire, and that of your correſpondent, who ſigns himſelf T. P. expreſſed in his letter, publiſhed in the *Muſeum Ruſticum* of laſt month, No. 66. I have here ſent you the *Proceſs for making Pot-aſh*, communicated by me to the Society for the Encouragement of Arts, *&c.* at their requeſt, and inſerted for ſeveral years paſt in their book of premiums for the colonies. And in order

to render it more conducive to the purpoſe for which it is demanded of me, I have ſubjoined ſuch farther information and remarks on this ſubject, as, I think, might give the beſt lights towards determining the query, whether *this proceſs might not be practiſed in Great-Britain*, with advantage, as well to the undertakers, as the public.

" *Proceſs for making Pot-aſh; with Directions for performing it with Profit by private Families, where Wood is plentifully burnt.*

" THE utenſils and implements neceſſary for making Pot-aſh in ſmaller quantities are——

" *Vats for diſſolving the Salts*, which may either be round like caſks, or ſquare. They may be made of the beſt white pine, or cypreſs; and if they be round, they muſt be well ſecured with iron hoops; or, if ſquare, with an oaken frame. They may be about four or five feet in depth, and of any diameter or width, according to the occaſion there may be with relation to the quantity of wood-aſhes for the making the pot-aſh. Theſe vats muſt have a kind of falſe bottom, formed by making a ſort of lattice-work, or grate, by placing boards with the edge upwards, croſs each other; ſo that the ſpaces, or areas, betwixt them may be about five inches ſquare, and eight inches deep. The cavities or hollows formed by theſe boards, muſt communicate with each other freely, by holes cut in the lower edge, where it reſts on the real bottom of the vat; and a vent muſt be made from the outſide of the caſk into one of them, on the ſame level, by means of a cock, in order to draw off any fluid from them: or, in the place of ſuch lattice, bricks may be laid at the diſtance of four inches from each other, on the real bottom of the vat.

" *A Receiver for the Lye*; which may be any kind of wooden veſſel, that can be conveniently placed under the cock of the diſſolving vats; and will contain the lye as it runs off.

" *Vats*

" *Vats for containing and keeping the ſtrong Lye* till the time of evaporation, or the *weak Lye* till it can be put upon freſh aſhes, for rendering it of due ſtrength; which may be caſks, or any other kind of veſſel that is tight, and will hold the due quantity.

" *A caldron of iron for evaporation*, where larger quantities are in queſtion, which may be ſet in the manner of a copper for domeſtic uſes; only a conſiderable part of the bottom muſt be left expoſed to the fire. It may be greater or leſs, according to the quantity of aſhes employed for the making of pot-aſh. But where private families intend only to employ the aſhes produced by their own fires, or them with ſome additional quantity not great, a large iron pot, ſuch as is uſually had for dreſſing victuals, or other like uſes, may be beſt employed, and requires only to be hung over a kitchen, or other domeſtic fire; by which the expence of fuel, and trouble of ſeparate attendance, may be ſaved in the principal part of the evaporation.

" *An iron rod*, a little longer than the depth of the iron pot or caldron, flatted at one end in the manner of a broad chiſel, for ſcraping frequently the bottom of the pot or caldron when the lye begins to thicken; elſe the bottom of the pot or caldron will ſoon burn out by the ſalts ſticking to it, and keep the heat from evaporating the lye.

" *An iron ladle*, to be uſed when the lye grows thick, as it is then apt to boil over, even with a moderate fire, more eſpecially when the ſcraper is uſed; a ſudden heat being cauſed when the ſalts are removed from the bottom of the pot or caldron.

" *An iron rake*, with cloſe teeth, for ſeparating bits of wood unburnt, or reduced only to the ſtate of coal, from the aſhes.

" *A ſtrong broad iron chiſel, with a wooden mallet*, for cutting the ſalt out of the caldron or pot after the evaporation.

" *A pair of ſmall common ſcales, with two phials* of equal contents and weight, for determining the ſtrength of the lye.

" *Pot-aſh* is the fixed alkaline ſalt extracted from the aſhes of burnt vegetables, and may be obtained from any kind of wood found in North America, except evergreens which abound in turpentine; as the pines, firs, cypreſs, cedars, *&c.* But though moſt kinds will afford ſome proportion, yet the large foreſt trees, whoſe leaves fall in the winter, ſuch as oak, aſh, beech, *&c.* when felled in a ſtate of decline from their age, and ſoon after committed to the fire, yield the greateſt quantity.

" The wood may be either burnt for domeſtic uſes, in common hearths or ſtoves, or purpoſely for the aſhes, on any dry flat ſpot of ground: but where a work is intended to be carried on at all times of the year, a kiln built of any commodious form with iron bars over a capacious aſh-hole, ſecured from being flooded by rain or melted ſnow from the contiguous ground, is moſt convenient. The wood ſhould be thoroughly burnt, and where there appear to be any remaining bits in an unburnt or coaly ſtate, they ſhould be carefully raked out by the means of the iron rake above deſcribed, and thrown again on the fire.

" As ſoon as the aſhes can be removed from the place where they are burnt, let them be put into a caſk, or laid on a floor in a ſhed, and gently moiſtened, and worked together, till they form a ſtiff paſte-like maſs; in which ſtate they ſhould be rammed as cloſe together as poſſible, and kept about three weeks, or till ſuch longer time, as there may be a proper quantity collected for extracting the ſalt.

" When the aſhes are thus ready, let them be put into one of the vats above deſcribed; the lattice or grate of which muſt be firſt covered with coarſe wheaten or rye-ſtraw, about the thickneſs of a foot; and in this vat they muſt be well rammed together as they are put in. When the vat is thus filled with them, let the ſurface be hollowed towards the middle, ſo as to form as it were a baſon to receive the water to be poured in. This hollow or baſon may be four or five inches deep, and muſt not extend quite to the edge of the vat, but muſt leave a ſmall mar-

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gin or ſhoulder of the aſhes, to prevent the liquor from flowing to the ſides of the vat, and finding a paſſage there, inſtead of ſoaking equally through the whole maſs.

"When the vat is thus prepared, fill the baſon or hollow in the aſhes with ſoft water, till they will imbibe no more, and then, after ſtanding ſome time, turn the cock at the bottom of the vat, and draw off the fluid, which will now, the ſalts being diſſolved, become a lye, into the receiver mentioned above. Remove the receiver, and put freſh water on the aſhes, ſupplying the baſon from time to time, till what runs off be void of taſte or ſmell.

"By this means a ſtronger and weaker kind of lye will be obtained, which muſt be put into ſeparate vats; and, if the ſtrong contain a ſufficient proportion of ſalt, it will be ready for evaporation. To know this, the moſt certain method is to weigh it againſt other lye made of the firſt degree of ſtrength; which may be moſt eaſily practiſed by filling two phials, of equal contents and weight, with each kind, and obſerving the difference. But it is not required, that this lye ſhould be of any preciſe ſtandard; only that it ſhould be as ſtrong as it can conveniently be made, to ſave time in the evaporation. A moderate deficience of ſtrength, therefore, may be allowed: as the trouble, occaſioned by bringing it to the full ſtrength, would be greater than that of evaporating it; and if it will float an egg, it may be ſuffered to paſs, where there is no inconvenience in prolonging the evaporation. When, however, the firſt lye is found too weak, it muſt be put on freſh aſhes, and drawn off as before directed, till it become of due ſtrength. The weaker lye, or ſecond running, muſt alſo be put on freſh aſhes for the ſame reaſon, and in the ſame manner; and if none be ready at the time, it muſt be kept till a freſh quantity be obtained.

"The lye being obtained of due ſtrength, it muſt be either evaporated in an iron caldron, in a proper furnace, as above-mentioned, where larger quantities of pot-aſh are to be prepared; or where only ſmaller quantities are in queſtion, in the iron pot. In which latter caſe the greater

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part of the evaporation may be performed on the fire of a kitchen, or other room, that is large enough to admit of boiling the pot.

"In the evaporation of lye in the caldron, the fire muſt be kept as ſtrong as is practicable, without occaſioning the fluid to boil over; and, as the quantity diminiſhes by exhalation, it muſt be again renewed, till the caldron, or pot, will receive no more, without being above four-fifths full, or till the whole quantity of lye to be evaporated be put in. The fire ſhould, however, be abated, when the ſalt appears to form on the ſurface, to prevent the waſte, and other inconveniencies, of an exploſive bubbling that may otherwiſe throw part of it out of the caldron; and the heat muſt be continued under due regulation, with reſpect to this accident, till the watery exhalation be wholly finiſhed. After which, even if the fire be increaſed, part of the matter will remain in the ſtate of a blackiſh-brown fluid for ſome hours, where the quantity is not ſmall; though the heat being duly kept up, the whole will become ſolid, of a ſtone-like hardneſs, and light brown or white colour. In the caſe of large quantities, and conſequently of a great caldron, a very conſiderable degree of heat is required in the laſt part of the operation.

"The ſame method muſt be followed, when the iron pot is uſed over a common fire, till the water be wholly evaporated. After which, this kind of fire being inſufficient to bring the ſalt to a due ſtate of dryneſs, a ſtronger muſt be ſupplied to finiſh the operation, which may be made in this manner: take off the pot from the firſt fire, and chuſing a proper dry ſpot of ground in the open air, let the three feet of it be there raiſed a foot or more from the ground, by means of bricks laid on each other, with the ends pointing to the center of the pot; and not paſſing further under the feet than may be juſt neceſſary for their reſting firmly on them. Put under the pot, and betwixt the bricks, pieces of dry wood of a convenient ſize, as alſo chips to make them burn more commodiouſly; and, having ſet them on fire, keep a due heat, as before direct-

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ed in the caſe of the caldron, till the matter be dry and hard; which may be eaſily done, by ſupplying fuel on each ſide of the pot, as it appears wanting.

"When the maſs is perfectly dry in the caldron or pot, and become whitiſh, or white, when ſuffered to cool, ſuppreſs the fire; and as ſoon as the diminution of the heat renders it practicable, cut it out with the chiſel abovementioned, and pack it up in tight caſks that will ſecure it from the air. This kind of pot-aſh is not the ſame with the Ruſſian, or any other, except ſome that has been brought here from America; *nor is it, in fact, ſtrictly ſpeaking, a* pot-aſh; *the other kinds being produced by throwing the lye on burning ſtraw, or other vegetable matter; by which means the calcined earth, or aſhes of ſuch vegetable matter, is mixed with the ſalt.* But this being conſequently a purer ſalt, is ſuperior in value; and when juſtly ſold, bears a greater price, as it may be uſed with more advantage in the making hard ſoap, which occaſions the far greateſt conſumption of theſe ſalts.

The above is the proceſs communicated by me to the Society, and which has been carried into execution in America with ſuch ſucceſs, that a very great quantity is now annually imported from thence hither. Though this proceſs was calculated at that time for the uſe of the colonies, yet the directions for making the pot-aſh would equally well ſerve here: there being nothing, except an information of the kind of wood proper in that country for making the vats, that peculiarly reſpects America.

As to the benefit, the public would receive from the production in Great-Britain of a conſiderable quantity of pot-aſh, or fixt alkaline ſalt in any commercial form, it cannot be doubted by thoſe, who are in the leaſt acquainted with the ſubject. The conſumption of this kind of commodity is every day increaſing in the Britiſh dominions, as it is a neceſſary article, as well in the linen manufactures, as in callico printing, and many others; and at the

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ſame time, the ſupply from the north-eaſtern parts of Europe is conſtantly failing more and more: ſo that the price of late years has been greatly advanced, and would have ſoon riſen to a height which might have been very injurious to our trade, if we had not found reſources for the obtaining this article in ſome of our own countries. It may be ſaid that this is, however, effectually provided for, by the preſent eſtabliſhment of the manufacture of pot-aſh in America; but though that may be a reaſon for being leſs ſollicitous to obtain this article here, than we otherwiſe ſhould have been, yet it by no means renders it wholly indifferent. It may probably be a conſiderable time before all we conſume can be ſupplied from thence. The effect of the fall of price, when greater quantities are produced, and a rivalſhip created betwixt the European manufactures of this commodity, and the American, may check the progreſs of it there; as freight, inſurance, *&c.* particularly in time of war, will always be ſenſible diſadvantages of the American produce, compared with the European. Diſturbances, and even revolutions, may alſo happen in thoſe colonies; which may interrupt our commerce with them, or greatly change the relations of it to our intereſt. All which render the ſupply of every ſuch article much more precarious, when we depend on them for it, than when we are actually poſſeſſed of the manufacture of it at home. And, after all, ſuppoſing we could obtain any conſiderable quantity at home, from the aſhes of wood at preſent conſumed for domeſtic or other purpoſes, and which are now thrown away, why ſhould we waſte what would turn materially to the public profit, and employ ſome hands, perhaps at preſent idle, any more in the caſe of this, than that of any other article of produce or manufacture? The queſtion, therefore, that remains to be decided, is, Whether or no the manufacture of pot-aſh may be carried on here *with profit to the undertakers*, by means of the proceſs above given?

In order to judge the better of this, and anſwer ſome difficulties, it is proper to conſider what ſort the pot-aſh

is, which ſuch proceſs affords: and, in order to that, it becomes equally requiſite, to examine a little more particularly into the nature and preparation of pot-aſh in general; and even of fixt alkaline ſalts, of which this is a kind. For, without a due previous explanation of thoſe principles, it is impracticable to ſpeak intelligibly of a ſubject ſo complex, and out of the common road of knowledge.

FIXT ALKALINE SALTS are of two ſpecies; the one is called the *vegetable fixt alkali*, and the other at preſent the *foſſile alkali*. But though they have real differences, as well with relation to their natural production, as to ſome of their properties, cognizable by means of chemiſtry, yet they are, nevertheleſs, promiſcuouſly uſed for many purpoſes in manufactures. All the fixt alkaline ſalts of either ſpecies, which make any article of commerce, are obtained from the burning or inceration of parts of vegetables, by waſhing or melting them by means of water out of the aſhes, where they are produced, and afterwards freeing them again from the water, by evaporation with heat. But, as various means of operation are employed for this purpoſe, and ſome of the ſalts are, conſequentially to theſe operations, left mixt with a proportion of the earth of the aſhes, while others are wholly freed from it, and rendered pure, and undergo moreover a change likewiſe, by a ſubſequent calcination practiſed on them; they bear different names, and a different marketable value. All the difference in them, nevertheleſs, conſiſts correſpondently to this view of their production and preparation, in the being of one or other of theſe two ſpecies mentioned; in their degree of purity, or in their having, or not having, undergone the ſubſequent calcination.

The *vegetable fixt alkali* is prepared for commercial uſe, in two different ways, and under the two different relative names of *pot-aſh* and *pearl-aſh*. The *foſſile alkali* in uſe, is only prepared by one general method; but the particular management of that method, and the different impurity reſulting thence, and from the ſubjects being two

different vegetables, have occaſioned alſo two commercial kinds of it, to wit, *Barillas* and *Kelp*. Theſe, however, not having any immediate relation to the queſtion before us, we ſhall drop any further notice of them here.

The difference betwixt pot-aſh, originally and ſtrictly ſo called, and pearl-aſh, conſiſts in the manner of preparation; the conſequential purity, with reſpect to the being free from the earth of the aſhes, or burnt oil of the vegetable; and from the pearl-aſh's being rendered more cauſtic, by a ſubſequent calcination, which is practiſed on it.

The principle of difference in the preparation of pot-aſh and pearl-aſh, conſiſts in this, that the evaporation of the lye, in the caſe of the pot-aſh, is made in an open fire, by throwing it on burning ſtraw, or other ſuch vegetable matter as will flame and make a briſk fire: and that, in the caſe of the pearl-aſh, it is performed in a pot or caldron, by means of exterior heat. Hence it neceſſarily follows, that the alkaline ſalt, obtained from the lye, by the evaporation in the open fire, muſt be mixed with the aſhes of the burning vegetables which make the fire, and with ſome of the moſt fixed part of the oil or ſulphureous matter of the plant; while that, which is obtained by the evaporation made in a pot or caldron, may be kept free from all heterogeneous mixture or impurity. The conſequential purity or impurity of the ſalts, therefore, reſulting from this difference in the preparation, make one great variation of the pot-aſh and pearl-aſh in their marketable value and diſtinction. But a greater degree of cauſticity, than is found in alkaline ſalts that have only undergone the degree of heat, which is to be given thro' the ſides of a veſſel, where the fire has no immediate acceſs to them, being found to render them more effectual for ſome œconomical purpoſes, the practice of calcining them for ſome hours, in an oven-like furnace, was introduced for that end; which gave another principle of variation of the pearl-aſh from the pot-aſh.

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It will appear, therefore, on comparing the ſalt produced by the above proceſs, with the account here given of the preparation of pot-aſh, that is not, ſtrictly ſpeaking, a pot-aſh, either conſidered with relation to the mode of preparing it, or to the real contents of its ſubſtance. Becauſe the evaporation of the lye is not made in the open fire; and becauſe the ſalt is not mixed with any calcined earth, or other impurity, as muſt of courſe happen in that operation. On the other hand, this ſalt is not pearl-aſh; becauſe it does not undergo the calcination that is uſed in the preparation of pearl-aſh; and which is requiſite, in order to give the degree of cauſticity that is found in the fixed alkaline ſalt which bears that name.

This kind of vegetable alkali was, nevertheleſs, that, of which the preparation was moſt ſuitable to the circumſtances of the American manufacture of it; becauſe it was applicable to all the material purpoſes of the real pot-aſh; and even with much greater advantages in many caſes; and being a pure ſalt, would bear a proportionable price here; and, by that means, ſave the charge of freight, package, *&c.* which would have been paid as well on the earthy and impure part of the common pot-aſh, which are mere dregs and filth in it, as on the ſalt itſelf, which is the only efficacious or eſſential part.

I have been the more explicit and minute here, becauſe, beſides the light which it may throw on the queſtion, how far this matter is practicable here with profit? it exhibits the principles of the proceſs, in a manner that may enable any, who ſhall be deſirous to make ſuch an attempt, to do it with more facility and certainty: and you may conveniently ſpare that room for it in your *Muſeum*, which could not be allowed in the Society's premium-book; and thence, indeed, occaſioned perſpicuity to give way, in ſome degree, to brevity.

If any attempt were to be made to produce pot-aſh, or any vegetable fixed alkaline ſalt as a commercial article here, it ſhould be the kind prepared by this proceſs. Be-

cauſe this method of preparation is by much the moſt expedient, where great quantities of wood-aſhes cannot be obtained; and a ſaving would be made in carriage to London, or wherever it is to be ſold or conſumed, by the ſuperiority of the price, which is material in the caſe of commodities brought from inland parts. There will always, moreover, be a ſtaple value of, and certain ſale for this kind, which is not the caſe of the pot-aſh prepared in the uſual way; as the goodneſs of ſuch is liable to vary greatly by accidents attendant on the manner of making it: and it is not applicable to many general uſes, where a pure fixed alkaline ſalt is either abſolutely required, or at leaſt more profitable, than an impure one that is of lower price. The ſale and value of ſuch kind of pot-aſh, as might be produced by the practice of this proceſs in Great-Britain, being thus allowed to be certain, the remaining matter to be inquired into, is, whether the materials can be procured here in a ſufficient quantity, and at ſuch a price, the rates of labour being alſo conſidered, as to ſupply a manufactory duly; and admit of its being carried on with profit?

As to the poſſibility of obtaining a ſufficient quantity of wood-aſhes here for this purpoſe, it muſt be granted; as there is, undoubtedly, more thrown away every year, than would yield all the pot-aſh, or other fixed alkaline ſalt, conſumed in Great-Britain. But as to the facility of collecting very conſiderable quantities, at a low rate, without burning wood on purpoſe, which would never anſwer the expence, there are great limitations. It is, however, undoubtedly true, that there are many places where wood-aſhes are to be had; and, indeed, where they are actually ſold at a very low price, leſs than (as I know the fact to be) ſome of the American manufacturers of pot-aſh have paid for them for that uſe. Now, therefore, though a large work could not perhaps be thus ſupplied; yet one ſufficient to make it advantageous to ſuch perſons as muſt otherwiſe be content with very moderate gain, in ſome other way,

way, might find enough within the proper diſtance: and in this, therefore, I join in opinion with your correſpondent T. P. With regard to the expence of labour, there is very little required; as the collecting the aſhes makes the principal part of it. For in the immediate operation for preparing the pot-aſh, if there were a ſupply of water at hand, a man and a boy might diſpatch a very conſiderable quantity. In this particular, indeed, it would fail to anſwer T. P.'s view of employing the idle hands, of which women and girls, in many villages, may be juſtly accounted a part; but it would afford ſomething towards their maintenance, if they were paid a ſmall rate for the aſhes of their own fires, or thoſe they might fetch or collect from other places, whenever they ſhould bring them to the manufactory. I conceive, therefore, upon the whole, that it is very practicable for ſome perſons living in towns or large villages, where wood is the fewel, to carry on ſuch a manufacture with very good profit; if they were to make an apparatus, of which the principal expence is an iron caldron, ſet as above directed, proportioned to the quantity of aſhes they could collect; and were to fix a moderate rate, to be paid to any who would bring the aſhes to them: or, in the caſe of bakers, gentlemen's houſes with large families, or other ſuch places, where a conſiderable quantity is produced, contract for, and fetch them away at convenient times. One ſuch manufactory in every town or large village, burning wood, or probably more in ſome, might find a reaſonable ſupply of wood-aſhes; and, after the ſalt is extracted from them, they would, as T. P. properly obſerves, be nearly as valuable for manure, as they were before: or, perhaps, if mixed with moiſt dung, or the fluid running from dunghills or ſtables, anſwer the purpoſe better, than when laid crude on land, as is practiſed at preſent.

Beſides what might be done in a larger manufactory, where a particular apparatus is provided, the method propoſed in the above proceſs for private families, uſing their domeſtic

domeſtic utenſils, and the aſhes produced by themſelves, or ſome of their neighbours, might be equally well practiſed in villages in England, as in America; and would, indeed, come nearer to T. P.'s wiſhes of employing women and children, as the whole might be done by them. But the greateſt difficulty, in this caſe, would be, where to diſpoſe of ſmaller quantities of ſuch a commodity, when they have made it? This, indeed, cauſes an almoſt inſurmountable impediment to this matter at preſent, unleſs the propoſed attempt was patronized in each place by ſome perſon, who could afford to advance the manufacturers ſmall ſums from time to time, till they had made a marketable quantity; which would not fail of producing an immediate return, if ſent to proper hands here.

It muſt be allowed there are reaſons of difficulty, but none of impracticability, againſt the hoping to ſee the ſame pot-aſh, which is brought from America, produced in conſiderable quantities here at home. But the principal is, the inattention, or diffidence of ſucceſs, which theſe kind of projects meet with from thoſe who are moſt proper to carry them into execution. Though the preſent failure of ſeveral of our manufactures is likely to ſend numbers adrift, who muſt then look about them, and turn their heads and hands to new objects of employment.

It may, perhaps, be objected againſt what I have advanced, that there is no proſpect of ſucceſs in an undertaking to make pot-aſh in Great-Britain, becauſe it has before been attempted, and is either now wholly laid aſide, or, at moſt, carried on in an inconſiderable manner. But to this I anſwer, that no inference can be drawn from any manufacture of pot-aſh ever attempted here, againſt the probability of ſucceſs of what is now propoſed: the kind of pot-aſh produced, and the circumſtances of price, *&c.* at the time when thoſe manufactures were eſtabliſhed, being extremely different from what is at preſent in queſtion. The pot-aſh made here was of the coarſeſt kind, being

burnt bean-ſtalks, ſtraw, &c. with a very ſmall proportion of lye thrown on them; ſo that the earthy aſh, and the fixed oil of the plant, made a great part of their ſubſtance. They were employed, on account of certain particular effects, in the making ſoft-ſope, and for ſome other uſes, which are now either diſcontinued, or found to be anſwered better by other means. Indeed, the ſubſtitution of hard for ſoft-ſope, in almoſt all common uſes of them, has enhanced the value of purer kinds of alkaline ſalts; and baniſhed, in a great degree, the uſe of theſe inferior kinds. The high rate of carriage, ſo much abated lately by the eſtabliſhment of turnpikes, was alſo a conſiderable impediment to the manufacture of a groſs commodity ſold at a low price, as was the caſe of the Engliſh pot-aſh; whereas, the kind now in queſtion, makes more than a triple return in money, taking weight for weight of each; and the land-carriage is diminiſhed at preſent in a large proportion. But the greateſt variation of the preſent circumſtances from the former, and which alone is ſufficient to make ſuch a manufacture very profitable now, as would have been a loſing one then, is the late great advance of the price of this kind of commodity, being now almoſt double: and this alone, when duly conſidered, takes away all the ſtreſs that could be laid on a retroſpection to the event of former attempts to make pot-aſh in Great-Britain.

I have thus endeavoured to gratify T. P. and yourſelves, in your deſire of procuring ſome information with regard to his inquiry on the ſcore of pot-aſh. I ſhall be very glad to find it may prove any way uſeful to the public, or ſatisfactory to you; and if any addition or explanation, I can hereafter give, will render it more ſo, you or your correſpondents may command it from me. As I ſhould be very happy in contributing to the ſaving, at this time, the great ſums we pay for pot-aſh, pearl-aſh, and barillas; which, I am ſatisfied, there is a probability, might be entirely effected, by the introduction of the manufacture, here, of ſuch pot-aſh as is now brought from America, in addition

to

to that which is or may be eſtabliſhed there; and by the improvement of the manufacture of kelp; which would ſuperſede the demand for barillas, and a conſiderable part of the pearl-aſh at preſent imported.

I am,

GENTLEMEN,

Your humble ſervant,

R. DOSSIE.

Muſeum Ruſticum, &c.

For FEBRUARY, 1766.

VOLUME the SIXTH.

NUMBER XII.

Obſervations on the preſent Neglect of planting Trees: And on the Advantages and Means of Culture of the Norfolk-Willow; and other quick-growing Trees.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AMONG all your correſpondents, I ſee ſcarcely any, who pay a due regard to that ſpecies of rural improvement, which ſeems at preſent moſt wanting in our country, while almoſt every other kind of it is perſued with zeal and ardor. Numbers employ themſelves in deviſing new methods of advancing the art of tillage and paſturage; —in deciding on the merits betwixt the broad-caſt and drill huſbandry;—in finding out new applications of ſallads, or other kitchen plants, that before regaled our own ſpecies, to the feeding or fattening beaſts;—in introducing foreign plants into our fields;—in diſtinguiſhing perennial from annual graſſes; and, contrary to their natural diſpoſition, making them grow ſeparate;—and, in ſhort, of paying every degree of attention ſpeculatively and practically to the tribe of *herbs*. At the ſame time

there prevails among us an equivalent diſregard and neglect of trees, the nobler part of the vegetable creation: thoſe which are now exiſting in foreſts, being ſuffered to ſtand till they become ſo ſuperannuated, as to be of no uſe but to burn; while thoſe, in other places, are untimely taken off, before they arrive at any valuable maturity: and, in both caſes, there is no care taken to provide ſucceſſors to them. The conſumption of wood in every way, is at preſent greater with us than in any former time: but while we are uſing it profuſely, we make no proviſion for a ſupply. The patriotic Society, indeed, ſeem to keep this object in view: but their premiums are, in general, confined only to ſuch kind of plantations, as are either not at all profitable, or, at moſt, can be only beneficial to the poſterity of thoſe who make them: and therefore only ſuitable to perſons of affluent fortune; and, even with reſpect to them, the incitement will hardly go farther, in moſt inſtances, than the inducing them to enlarge an avenue, or extend a grove, calculated to enrich the proſpect, or render the environs of their manſions more pictureſque.

Whence, then, ariſes this partiality which we entertain, with regard to herbs and trees, in favour of the former? That, while every body who turn their minds to agriculture, are aſſiduous in improvements of the one, the other * ſhould ſeem almoſt wholly neglected, though the good of the public renders the contrary neceſſary. It is worthy conſidera-

* There is in general ſome foundation for what our correſpondent here ſays. But the neglect he complains of is not univerſal. The Earl of Northumberland begun in the north to give a noble example, by making very large plantations of a great variety of trees, as well of all the foreſt kinds as others. He has been followed by many perſons of fortune, particularly in Northumberland; inſomuch that this part of the country, which was formerly almoſt deſtitute of trees, is now finely wooded. Among other inſtances, Mr. Fenwick has lately obtained a gold medal from the Society for promoting arts, &c. for having planted twenty thouſand Scotch firs. It were much to be wiſhed, that this ſpirit would extend itſelf into other counties, where there are large tracts of waſte land; which would, by this means, be rendered profitable to the public, and preventive of thoſe inconveniences, our correſpondent juſtly foretels muſt otherwiſe in time overtake us, from the ſcarcity of wood. O.

tion,

tion, ſeriouſly to inquire into the reaſons how this happens; becauſe a right examination into them, may, perhaps, ſuggeſt ſome remedy, at leaſt palliative to the evil.

In the firſt place, then, vogue or faſhion has a very conſiderable ſhare in this matter. It is now the predominant taſte to have a farm, and meddle with huſbandry, and drill-culture, lucerne, burnet, &c. are the reigning objects. In the next place, there is ſome certain return in a ſhort time, from the culture of herbs; and the money laid out does not appear ſunk in the ſame manner as attends the planting of foreſt-trees: which, perhaps, even at the moſt diſtant time, will not yield a competent profit on the neceſſary expence, unleſs to gentlemen in very peculiar ſituations. In the third place, young plantations are very liable to deſtructive accidents, by the inroads of beaſts, the devoration of inſects, or the inclemency of weather. And in the laſt place, being more out of the common track of practice, the culture of trees is much leſs generally underſtood than that of herbaceous plants.

The firſt of theſe reaſons would not probably, from its own nature, be durable; but the ſecond, or want of an earlier return, or perhaps of any profit, even upon the moſt diſtant one, is of ſuch a nature, as can hardly be ſuperſeded, but by the interference of government; except in the caſe of a few particulars, who have public ſpirit, and private ability ſufficient to lead them, to ſupport them in ſuch undertakings, as making plantations for the benefit of poſterity. The third reaſon greatly corroborates the ſecond: but by improvements in the art of making cheap and ſtrong fences, the more extenſive knowledge of the means of driving off or deſtroying inſects, and the experience of adapting the time and methods of planting to the contingence of ſeaſon, the diſadvantages of this kind may be hereafter greatly diminiſhed. The fourth reaſon admits of much more adequate remedy, and your work may be rendered greatly inſtrumental to it. For, if gentlemen, or nurſery-men, who are well acquainted with this ſubject, would communicate their knowledge to you, with reſpect to each parti-

cular kind in detail, an intelligence in the art of planting trees would be ſoon diffuſed among thoſe, who are in a ſituation to profit by it.

But, after all, much cannot be done towards the inducing great numbers to plant foreſt-trees, that require a very great length of time to bring them to maturity. What we ſhould principally aim at, therefore, ſhould be, by the planting quick-growing trees which yield an early profit, to ſave as much as poſſible thoſe of the other kind from being immaturely cut down, and to ſupply the preſent want of them by ſuch kind of wood, as may be raiſed without the diſadvantages attendant on the culture of the common foreſt-trees. This is the proper palliative remedy for the ſcarcity of trees in our country, and would be a very material one if it were duly practiſed; and it is indeed to be wondered at, that much more is not done towards it already, ſince the culture of quick-growing trees may be productive of as great profit to the undertakers, as benefit to the public. This is what I intimated by my jocoſe complaint of the partiality for herbs againſt trees. For there is really a little inconſiſtence in the zeal, with which the modern virtuoſi in agriculture ſeem to perſue many objects of much inferior concern, while they wholly neglect this. A little conſideration of ſome very obvious facts will clearly ſhew the truth of what I advance. There are various kinds of trees, which, when planted in a proper ſoil, are of very quick growth, and eaſily propagated from ſets or cuttings. This quality of being propagated by ſets, takes off not only ſeveral years of the primitive growth, but exempts the planter from the danger of thoſe numerous accidents to which ſeedling plants, and even the ſeed itſelf, are expoſed. And by chuſing ſuch ſpecies of trees as ſoon grow very large, and are yet of a firm texture, and planting the ſets in ſuch number, that ſucceſſive proportions of the whole may be taken up, at different periods, as the trees become incommodious to each other, great gain may be had in a moderate ſpace of time, and an increaſing ſource of property be left, which will conduce to enrich a family hereafter,

after, without any temporary diminution of the trading ſtock or fortune. The kinds, which may be thus planted, with a proſpect of quick return, are ſeveral ſpecies of willow, particularly that called the Norfolk; ſallows; poplars, particularly the Carolina kind; and ſeveral others. There is no inſtance of a more certain and advantageous plantation, than that of the Norfolk-willow, as demonſtrated by the late Mr. North, in an appendix to a little treatiſe on graſſes, publiſhed by him ſome years ago *. As this pamphlet may have reached the hands of but few of your readers, and will, now the author is dead, be ſcarcely ever republiſhed; and as this part of it is extremely well worth preſerving, and illuſtrates as well the means of doing, as the motives of undertaking, what I have been recommending, I have here ſent it to you, and wiſh you would inſert it intire; and it may ſerve as an example of a profitable method of cultivating trees of this kind, that may be applied to ſeveral others, alſo obſerving a due regard to the difference of circumſtances.

" *Directions for propagating the Sound-growing Norfolk-*
" *Willow.*

" THIS willow (I dare affirm) will prove very pro-
" fitable to the planter, and of great utility to the
" kingdom in general. It will grow taller and larger in

* We are obliged to Philoſylva for this valuable communication, and think it well deſerves a place in our collection, notwithſtanding it has been before publiſhed in the corner of a ſmall work, which ſcarcely ever found its way into the world, and by the death of its author will be ſoon loſt in oblivion. The facts are not to be denied, and the calculations ſeem moderate: after admitting which, it muſt be allowed that a great incitement to the cultivating trees of quick growth is here furniſhed, and the particular inſtructions for the management of plantations of this kind, though briefly and ſimply delivered, are yet very full and clear, and may be of conſiderable utility to many, who not being acquainted with the practice of planting in this way, nor within the reach of proper aſſiſtance, and may yet be willing to engage in ſuch an undertaking. R.

" twenty or thirty years, than moſt other ſorts of trees will " in ſixty or ſeventy. It grows very kindly, and great " quantities may be propagated at a ſmall expence. A " very conſiderable profit from it will come to the plan- " ter in five or ſix years after planting; in eight or ten " years more another profit will ariſe much larger than the " firſt; and at laſt, which will be in about twenty or thir- " ty years after planting, the profit will be ſurpriſing, as " I will make it appear in the ſubſequent account.

" In order to begin with this willow-plantation, the " land muſt be ſecurely fenced from all kinds of cattle, " and muſt be well ploughed or dug in winter, to make " the ſurface looſe, and to kill the graſs and weeds. The " ſeaſon for planting is from November to April, and ſome- " times later. The dryeſt land ſhould be planted firſt.

" One year's ſhoots are beſt for ſets when they are de- " ſigned to make large trees. The ſets ſhould be cut to " eighteen or twenty inches long; about eight or nine in- " ches of the thick or lower ends muſt be thruſt into the " ground. A ſtrong ſhoot of one year's growth will fre- " quently make three or four good ſets, but I would not " adviſe cutting any ſets from the very tops of the rods, " becauſe they will be too weak to make ſtrong ſhoots the " firſt year.

" The proper diſtance theſe ſets ſhould be planted, is " about three feet promiſcuouſly. An acre will require " about five thouſand. In June, after planting, the ſets " ſhould be all looked carefully over: and ſuch, as have " more than one ſhoot, ſhould be reduced to one, and it " ſhould be minded, to leave the upermoſt and ſtrongeſt. " The ſuperfluous ſhoots ſhould be cut off cloſe to the ſet, " that the bark may ſooner cover the wound.

" At the ſame time the ground ſhould be hoed over to " kill the weeds, and to looſen the ſurface, in order to " ſow turneps, which will no ways hurt the ſets, but rather " be of ſervice, provided they are properly hoed, and ſet " out at good diſtances, and not ſuffered to grow within a " foot of the ſets. The winter following, when the tur-

" neps

" neps are gone, the ground ſhould be dug all over, and, " the ſummer after, the weeds cut down with hooks; which " is the laſt, and all the labour of cleaning they will ever " want. The beſt inſtrument to dig theſe plantations " with, is the ſort of broad-trined fork they uſe in Kent " to dig their hop grounds. The price, by the acre, is " twelve ſhillings for once digging.

" When theſe ſets have grown four or five years, about " three-fourths of them muſt be dug up, in order to leave " ſpace for the others to thrive. If they have throve well, " in five years they will be above a foot in circumference, " and twenty or thirty feet high. Theſe young trees will " be very proper for many uſes, as for chair-makers, hoops, " gates, hop-poles, *&c.* and will ſurely be worth three- " pence a piece, upon an average.

" From five thouſand ſets which are planted upon an " acre, at about three feet apart, certainly three thouſand " may be very properly taken away, and the remaining " ones will not be left quite ſix feet apart. If theſe young " trees are valued at but three-pence a piece, they will be " worth thirty-ſeven pounds, but I rather believe, they " will be worth more. Eight or ten years after the firſt thin- " ning, three parts in four ſhould again be took up, which " will be about one thouſand five hundred; and five hun- " dred or more will be left at about twelve feet apart, " which ſhould grow twelve or fifteen years longer, when " they will be in fine maturity. The ſecond thinning " will be of much more value than the firſt; upon an ave- " rage, no doubt but they will be worth half a crown a " tree at leaſt, as they will be tall and large, and may be " put to divers uſes. Many of them will be very proper " for maſts for ſmall veſſels, as the wood is light and " tough.

" In twelve or fifteen years more, the remaining five " hundred trees will be very tall and large, perhaps above " ſixty feet high, and five or ſix feet in circumference. " The leaſt value one may conceive muſt be twenty ſhil- " lings a tree; ſo that, at the loweſt profit one can ſet upon

" the

" the produce of an acre of land, planted with this noble " willow, in about thirty years at moſt, it will be worth " ſix hundred pounds, and all the rent, &c. paid, at the " rate of twenty ſhillings a year. I really think I have " allowed too low prices for the growth, and that it is " very probable they will be worth more. The wood " of this tree is very white and tough, and without pith or " ſap; ſo muſt be very proper for carvers, turners, &c. " Boards of this wood are as good for floors, or wainſcot- " ting common rooms, as any other. I am told, by a " man of great veracity and judgment, that poſts of this " wood, ſet in the ground, will out-laſt all other ſorts, ex- " cept yew, or heart of oak. He alſo affirms, that there " is no tree upon the earth ſo proper for ſhips maſts as this, " as it is light and tough, and will not ſplinter, as fir " does.

" This tree has oblong, pointed, ſaw-edged leaves, of " a moſt refreſhing light green: at the bottom of each foot- " ſtalk grow two ſmall wings, which almoſt environ the " young ſhoots.

" This willow will thrive upon almoſt any ſoil, ſo it be " not too dry.

" It is alſo the beſt kind to plant, in large ſets, by the " ſides of rills, &c. where they will produce larger lopping, " and in leſs time than any other ſort of willow will do.

" If any gentlemen, &c. have a mind to make planta- " tions of this profitable tree, it would be well worth their " while to lay out the ground in ſome gentle meander- " walks; which will be but little extraordinary expence, " and, in few years, will give both ſhade and ſhelter.

" This willow will make the moſt profitable coppice " woods, to cut every ſix or eight years, for hop-poles, " and many other very uſeful purpoſes.

" They ſhould at firſt be planted about two feet and a " half a part; and, after five or ſix years, three parts in " four ſhould be dug up, and the remainder cut down " within ſix or eight inches of the ground, to remain for " ſtubs.

" This

"This is alſo one of the beſt ſorts of willow for baſket-
"makers, as it grows freely, and is very tough.

"In many countries, where firing is ſcarce, this willow
"would turn to great advantage, merely for fuel; as it
"will grow into large billets, in three or four years, and
"will burn very well both green and dry.

"Since I wrote this, a gentleman told me, that he
"knew of three willow-trees being ſold for fifteen pounds,
"but he could not inform me what kind they were; I fan-
"cy them to be the *bright ſwallow-tail willow*; for, next
"to the *Norfolk* kind, it is the largeſt growing ſort; and
"beſt for moſt uſes."

Mr. North calls this the *Norfolk willow*; but that is only a local name for this tree. It is by ſome called the *Hertfordſhire willow*, and has had various other names in different places. The deſcription he has given of the leaves, and the firm ſound texture of the wood, without pith or ſap, will, however, ſufficiently aſcertain the ſpecies to thoſe who may not before know it. When he publiſhed this account, he advertiſed, that he would furniſh ſets to any who might want them. As he is very lately dead, who may be his ſucceſſors in his buſineſs, or whether they will continue to provide for the demand of ſets, I am at preſent ignorant. But it would be a matter of regret, that the difficulty of procuring them, ſhould be any diſcouragement to thoſe who may be diſpoſed to make plantations of this tree.

There is an addition, which might be made to Mr. North's plan of deriving an intermediate profit from a plantation of theſe trees, while the principal of them are growing to due maturity. It is this, to leave at the ſecond thinning one tree in the middle of every four, that are intended to grow to maturity; which middle tree will conſequently be at more than ſix feet diſtance from any other, being in the diagonal line of the four. The trees ſo left ſhould be then cut down, within ſix or eight inches of the ground, and ſuffered to ſhoot afterwards as ſtubs or pollards.

In which ſtate they will afford hop-poles, billets, twigs, for baſket-work, &c. if cut at proper periods, from ſeven years to every other year, reſpectively to the purpoſes, for which the ſhoots may be wanted. This kind of plantation, of pollards, with tall trees, is not ſo proper in a drier, as in a moiſt ſituation; becauſe the crouding the roots may, in dry ſeaſons, injure the growth of the trees intended to ſtand for wood, where there is a want of moiſture in the ground. But in a wet ſoil it will rather aſſiſt than retard them; and will be a conſtant ſource of profit during the whole continuance of the plantation.

Other trees may be treated in the ſame manner, allowing for the reſpective differences of each, with very great advantage, in ſwampy and marſhy ground, as in the low parts of meadows, or the waſte of manors; and the plantations will often prove a beauty and convenience in other reſpects. In ſuch caſes the twenty ſhillings per year, allowed for rent in Mr. North's account, may be wholly or moſtly ſaved. I could verify the general tenor of what he has alledged, as to the profits of ſuch plantations, from ſeveral inſtances of my own knowledge, where gentlemen have received profit from them in a very unexpected degree. This, when well underſtood, might furniſh very ſtrong inducements to private perſons to plant in ſuch a way; and the public would find great benefit in it, by its rendering fuel cheaper: the high price of which, particularly in thoſe places of the more ſouthern parts, which are ſupplied with coal from the north of England, is now becoming a diſtreſs to the poor, and an inconvenience to the rich. Several manufactures, likewiſe, as well as huſbandry, would receive advantages from it, by the cheap proviſion of wood for many uſes. And by keeping down the rates of coppice, as well as foreſt wood, it would prevent the latter from being immaturely deſtroyed by the temptation of the price, for which every kind can in many places be now ſold. If what I have ſaid ſhall, in any degree, contribute to bring about ſo deſirable a conſequence, it will be an ample reward for my trouble in this letter; which I leave you at liberty

to insert in your *Museum*, or suppress, as may seem most expedient to you.

I am, Gentlemen, yours, &c.

PHILOSYLVA.

NUMBER XIII.

Account of a peculiar Method of Tillage, at a Place in the East-Riding of Yorkshire: *and an Examination of the Proofs advanced to shew the fatal Effects of Ground-Ivy, when eaten by Horses.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I Think there are few parts of your compilations more useful than accounts of the different kinds of management in the distant parts of the kingdom; especially in tillage: because, such accounts may very probably give rise to the adoption of more reasonable methods than are at present in use in distant parts, where the circumstances are the same as those from which the accounts are drawn. But this track of improvement has not been hit upon; especially, where such peculiarities of management are the result of observation and experience.

I was much pleased, therefore, gentlemen, with an account which I received about six weeks ago, of a peculiar management of tillage at *Market-Weighton* in the East-Riding of this county, given to me by a sensible man of veracity, who was born and bred a farmer in that neighbourhood.

I was then too *much affected* by the *unexpected* stroke of my father's death, to take all the notice of his account, which I should have done at *most other* times; and as he is now removed to some distance, and I cannot conveniently send, for his perusal, the account I am about to give you. Nevertheless, I am persuaded, that I remember all the principal circumstances; and if I, or my informer, be mis-

taken in any material ones, I hope ſome public-ſpirited correſpondent, in that part of the country, will endeavour to ſet us right.

The ſum of the account, to the beſt of my remembrance, is as follows: The inhabitants of *Market-Weighton* have five fields, two of a ſandy ſoil, and three of a ſtrong clayey ſoil; the former, as will eaſily be conjectured, deſtined to *rye*, and the others to *wheat*. Their ſandy lands are diſpoſed in four ſwathes breadth; and finding by experience that conſiderable parts of each land, towards each furrow, are ſtarved by the coldneſs of the water dripping from the higher parts of the lands, they have for many years altered their former method: and only ploughed the half of each land, *viz.* the two middle ſwathes: ſo that they have now *excellent rye* growing on the *higher* and *dryer* half of every land, and *excellent meadow* growing on the *lower* and *wetter* half, which being juſt two ſwathes, is mowed with great eaſe and exactneſs.

It will, perhaps, gentlemen, be thought by ſome of your correſpondents, that by making *narrower lands*, they might have more dry land, and conſequently more corn. But, I apprehend, theſe induſtrious huſbandmen find by experience, that when they make their lands narrower, and conſequently with leſs deſcent, the water ſtagnates in the higher parts, and conſequently ſpoils their whole crop. Nor could they, I ſuppoſe, ſow more corn on their lands, in their preſent diſpoſition, with convenience, as their preſent method allows them juſt one ſwathe on each ſide.

They have *rye* and *meadow* in one of their two ſandy fields every other year, and a fallow the next year. The having half of the field in graſs, affords good graſs for their ſheep, *&c.* in that year; and allows them to keep a good ſtock thereon; and this ſtock, in return, manures the ground conſiderably, both the *fallow* and the *ſwarth*. One of their wheat-fields affords them plenty of *worſe* or *ſpring* corn; and thus they are ſupplied with *wheat*, *rye*, *ſpring corn*, *meadow*, and *ſummer graſs*, from their five fields, which in any other management they could ſcarcely be.

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It is obſervable alſo, that by this management they only plough as much as four fields, and conſequently can afford one-fifth more ploughing to every piece of ground in tillage, than they otherwiſe could, on ſuppoſition that their fields are all of the ſame extent.

Theſe provident people, gentlemen, have another piece of management well worthy the attention of others. They have two great fairs for ſheep; one in *ſpring*, and the other in *autumn*. They hold the former of theſe fairs in one of their fallow fields, which is to be ploughed up in ſpring. The concourſe of ſheep, horſes, *&c.* manures this field ſurpriſingly, and then they turn in the dung before it be evaporated or baked. Their later fair is held on the other fallow field, which is ſoon to be ſown with hard corn. And here they receive equal benefit.

Whether they have their ſpring fair on the *rye* or *wheat* field, I know not; but I apprehend them to have it on the former: as *rye* is ſown ſooner than *wheat*; and the time of ſowing might be too late for their autumnal fair.

Whoever, gentlemen, has ſeen the uſeleſs naſtineſs which is made by ſheep at fairs, in the ſtreets of great towns, will think this management of the *Market-Weightoners* highly deſerving of imitation; eſpecially in the latter end of the year, when the rains bring in much ſoil with the ſheep.

I would, gentlemen, venture to recommend one improvement to theſe ſenſible people, *viz.* after a certain number of years to plough up one of their ſandy fields intirely *, and to croſs-plough it, and endeavour to mix the ſoil of the ridges and furrows thoroughly together, and then to make the furrows where the ridges were, *&c.* and to ſow down the outward ſwathes of each land with ſeeds proper to the ſoil. The advantages hence reſulting, are ſo obvious, that it would be an affront to their underſtandings to inſiſt upon them.

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* There can be no doubt but that croſs-ploughing land, where the level admits of it, would be very advantageous in moſt caſes. It not only breaks and mixes the ſoil of the former ridges more effectually, but renders them much more fertile, by making the new ones conſiſt partly of the freſh and unexhauſted earth of the fur-

In your *Muſeum* for July laſt, you inſerted a letter from your old correſpondent *Ruricola Gloceſtris*, on the *ſuppoſed* fatality of ground-ivy to horſes. I ſay the *ſuppoſed fatality* of ground-ivy; for that writer had too much modeſty boldly to aſſert it, eſpecially as he advanced no proofs. It is obvious on reflection, that the finding of ground-ivy in the ſtomach of a dead horſe, gives no concluſive argument of the fatality of that herb. For it would prove, in turn, every herb and plant to be fatal to that noble animal, as ſuch herb and plant happened to have been eaten *late*, or the *laſt* by the animal: whereas, in truth, the cauſe of the animal's death is often at a diſtance, and requires much reſearch.

The abounding of ground-ivy, in any *ſtubble* or *field*, in which an horſe ſickens and dies, is inconcluſive as a proof that the horſe dies by ſuch herb; ſince ground-ivy abounds, in many fields, in which no horſe dies or ſickens, though he feeds there.

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furrows. In looſer ſoils, or where the ridges have been laid high, this is more particularly efficacious; for the rain having neceſſarily waſhed down the fineſt parts of the earth, as well as the ſalts formed on the ſurface, they conſequently render the ſoil in the furrows a rich manure. In places, alſo, where ſalt, lime, chalk, wood-aſhes, or any ſaline or earthy manure, or compoſt, has been employed, the ſame practice muſt avail greatly; becauſe there, the ſalts, and finer earthy particles, muſt abound in a very conſiderable degree in the furrows; and, being now brought up to be a part of the ridges, will be diſperſed over the other part of them by harrowing, and the diffuſion which always happens from rain. It might, perhaps, in ſome caſes, very well anſwer to ſpread the looſe earth of the furrows, where croſs-ploughing is not convenient, by other means, over the ridges, in order to make a more general and effectual mixture of it with that of the ridges; as it would, in proportion to the quantity, be ſuperior to any freſh manure. And it is poſſible methods might be contrived for this purpoſe, that would not render it more laborious or expenſive than the fertilizing effect would balance. We preſume, this notion will, by no means, appear new to ſome of our readers; but they will excuſe us for dwelling on it, as there are many to whom it has probably not occurred in an adequate manner; and the inculcating hints of improvement to ſome, which are borrowed from others, is one of the principal intentions of our work. R.

The compilers of the *Gentleman's Magazine* have republiſhed, in their collection for *Auguſt*, the letter of *Ruricola Gloceſtris*, in your publication for July: and done it *verbatim*, except that they have omitted the addreſs, and have reduced *Ruricola Gloceſtris* to R. G.

Behold! Gentlemen, in the Magazine for *October*, we have a letter addreſſed to the compilers, and founded on Ruricola's letter, as *originally* addreſſed to them. If the compilers of other *monthly publications* ſteal your *original* pieces, and thence acquire correſpondents who undertake to *illuſtrate* or *confute* them, it is no wonder, if you cannot always ſupply your own monthly publication, as you propoſed to do.

However, I think, you have loſt no honour by wanting the correſpondence of this anonymous confirmer of *Ruricola*'s ſuggeſtions. He aſſerts, that he knows ſeveral horſes ſeized as *Ruricola* deſcribes, in ſtubble fields, in which *ground-ivy* abounded, and that two of them died, and three recovered by uſe of the *emetic wine*. I have ſhewn above, that we cannot juſtly conclude hence, that *ground-ivy* was fatal to any of them; eſpecially ſince he owns, that "the "dead horſes were not opened, and therefore the *original* "cauſe was not diſcovered." What this confirmer of *Ruricola*'s hypotheſis adds, *viz.* that "he remembers three "or four horſes ſeized in the ſame manner, when ground-"ivy was in the greateſt perfection," is ſtill more inconcluſive; for if we cannot juſtly conclude this herb's fatality to horſes, from their death in fields *where* it *abounds*, much leſs can we infer it from their death at a time when it flouriſhes.

This anonymous gentleman tells his readers, that he will extend his conjectures further, by *ſuppoſing* how ground-ivy may affect this noble animal, the horſe. *Conjectures* and *ſuppoſals* are of no worth in ſuch caſes as this, when the fact is not *eſtabliſhed*. Eſtabliſh that, and we will thank him for conjectures when abſolute proofs cannot be had. Now, gentlemen, this anonymous phyſiologiſt's *conjectures* and *ſuppoſals*, amount to no more than this, *viz.* that

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ground-ivy being full on both ſides of ſharp prickly points, will in the guts plaiſter itſelf with *mucus*, ſo that their natural motion can ſcarce remove it. Now let any one, who is impartial, examine ground-ivy, and ſee if he can diſcover ſuch ſharp prickly points as are at all likely to have the effect here aſcribed to that plant; and if he ſtill doubts, let him reflect that horſes are able to digeſt the ſharp-pointed furze, the ſharp-pointed yew, *&c.* and it will not be in his power to acquieſce in theſe *precarious conjectures* and *ſuppoſals*.

Providence has endowed brutes with the faculty of diſtinguiſhing *ſalutary* from *pernicious* food; and ſince *ground-ivy* is a moſt common herb, if it were fatally pernicious to horſes, and they were not by inſtinct reſtrained from it, it is reaſonable to conclude that the ſpecies would by this time have been extinct. If any body ſtill thinks, that *ground-ivy* is fatal to horſes, he may try the experiment, by giving no other food to ſome worthleſs horſe, which yet is not in a dying ſtate. If the horſe refuſes it, he may conclude that nature has given a ſalutary antipathy to it; if he at laſt eat it, and die, we may conclude the herb fatal to this animal; but cannot conclude, that other horſes, at liberty in open fields to chuſe their food, die by it, but rather the contrary, from their innate averſion to it, if ſuch be found.

I am, GENTLEMEN, *&c.*

Dec. 1, 1765. THOMAS COMBER.

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NUMBER XIV.

Observations on the Practicability and Means of producing Silk in England with Profit: in a Letter from Agricola.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN a letter that I sent you, on the importance of agriculture to Great Britain, and the means of improving it, which you published in your *Museum* for October and November last, I promised to supply you with some observations on various subjects, suitable to your plan; particularly with respect to such articles as the London society for promoting arts, &c. had adopted, or should hereafter adopt, as objects of their consideration or encouragement. I have already made good part of that promise; and I here perform a further part of it, and give you my sentiments on a subject with regard to which, though that Society has not offered any premium, nor taken any other public measure, they have yet shown their desire of promoting it: and their belief of a possibility of success, by a private act * of approbation and reward done to a gentleman,

* The circumstance I allude to, with relation to the Society, is this. A gentleman, who signed his name *Rusticus*, sent, from the country, some skaines of raw silk of his own production. They were referred to a committee, who gave it as their opinion, in a resolution, "that it appeared, the worms had not been "well managed, nor the silk well reeled: but, that otherwise, "the silk would have been equal to the best foreign." On a discussion, which of course then occurred, on the question, whether the producing silk in quantity, was an attainable matter in this country, the committee were so much induced to believe the affirmative, as well from conclusions drawn from relative facts, as from the opinion of a gentleman, whose great good sense and probity, together with a consummate experience, as well as speculative knowledge, of every thing regarding the matter, made him a very respectable authority. And in consequence of

man, who ſent to them ſome proofs at leaſt of his ſpirit and inclination, to ſet the example of a bold attempt in the matter.

The article I mean is, THE PRODUCTION OF SILK IN ENGLAND: which, could it be effected, ſo as to furniſh the whole, or great part of what we now conſume, would, perhaps, be more advantageous to the community, than any other ſubject whatever, of produce or manufacture. And there is great reaſon to believe, as well from the authority of the beſt judges, as from concluſions drawn from the circumſtances of the thing itſelf, that it is far from being impracticable.

As the production of ſilk at home does not, however, ſeem to be attended to at preſent, in the degree, I conceive, it merits, it is my intention here, to ſet both the utility and practicability of it in a juſt and full light: the firſt ſtep towards the eſtabliſhment of any undertaking, which requires numbers, being to incite numbers to attempt it.

In examining into the importance of producing raw ſilk in Great Britain, we muſt conſider it, as a commodity we at preſent wholly purchaſe of foreigners: as one, of which we ſo purchaſe to an extreme great amount, that lies almoſt entirely againſt us in the balance of trade with the countries of whom we take it:—as one, the price of which is now ſo high, as to bring the moſt perplexing diſtreſs on our manufacture of wrought ſilk, by the temptation it gives to the contraband importation of that of the French, an evil, which muſt continue unleſs ſome extraordinary remedy be found for it:—and as one, of which the future ſupply is precarious, and may ſo fail, as to occaſion hereafter the abſolute ruin of our manufactories of wrought ſilk. The prohibition of the exportation

this opinion, they recommended it to the Society, to make the gentleman, who ſent the ſpecimen of ſilk, a preſent of a reel and baſon, made in the manner of thoſe uſed in Piedmont, together with Mr. Pullen's book of inſtructions for the management of worms and raw ſilk: as a mark of their approbation of his attempt, and an encouragement to him to perſevere in it. Agricola.

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of this article from China, whence we before obtained part of what we uſe, which has had a great effect on the general price of ſilk here, evinces the ground there is for the laſt of theſe conſiderations, as the ſame, or other cauſes, may, from various events, deprive us of the reſources we yet have for the procuring what we want. The reſt of the conſiderations are founded on ſuch notorious facts, as render any proof of, or argument for their truth unneceſſary; and take away all occaſion to expatiate further on the matter in this view.

There is, nevertheleſs, another principle of equally intereſting conſequence, from whence the importance of producing ſilk in England may be deduced. This is, the employment it may afford to *idle hands*, and the diſtreſſed poor. To judge properly of the extent of this benefit, it is requiſite to enquire into two points: how many and what ſort of perſons theſe hands would be. As to the firſt of theſe points, or how many people might be employed in the buſineſs relative to the production of ſilk: could the matter be at all carried on with profit to the undertakers, the number of hands that might be enlarged in the various offices of tending the worms, and winding the ſilk, would be extremely great; far beyond what thoſe of any other manufacture or culture could equal. As to the ſecond point, or what kind of perſons might be proper for this work: it would happily be, for the moſt part, *women and children*, whoſe preſent idle and unemployed ſtate is not leſs the ſource of vice, than it is of miſery. This is a conſideration of the moſt moment to our country in its preſent ſituation, of any other whatever. Since to eſtabliſh the habit of induſtry in females, and the youth of both ſexes, is the only means to check the growth of that licentiouſneſs and depravity of manners in the lower people, which ſeems to threaten the deſtruction of all civil order among us. Nothing can more conduce to reform, as well as to enrich Great Britain, than the finding out the means of ſettling to work all the idle youth, women, and poor of both ſexes.

In every light, the introduction of this moſt valuable produce, appears of ſuch conſequence to us, as renders it highly worthy the diſquiſition, how far there is a probability the obtaining it could be effected. In order to this, it is proper to examine into four ſeveral circumſtances, the right concurrence of all which is, indiſpenſibly, requiſite. The firſt is, *whether the climate of this country will agree ſufficiently well with the ſilk-worms, to admit of their being duly propagated, and preſerved while they are making the ſilk:* the ſecond, *whether the proper food can here be provided for them:* the third, *whether the preſent rate of labour and other attendant charges, would not raiſe the expence of producing the ſilk beyond the due bounds:* and the fourth, *whether the knowledge neceſſary to the performing this matter, as a practical art, is to be obtained here by thoſe who may be diſpoſed to attempt it.* To ſome, or all of theſe circumſtances, the objections muſt relate, which are brought againſt the practicability of our producing raw ſilk with profit: and I ſhall, therefore, conſider them ſeparately, in order to weigh more juſtly the force of what is alledged with regard to each.

As to the firſt circumſtance, that is, *whether the climate of this country will agree ſufficiently well with the worms, to admit of their being duly propagated and preſerved, till they have made the ſilk:* the negative of it has been generally ſuppoſed; and offered as a principal reaſon againſt the practicability of our producing ſilk with profit. But this notion does not appear to be well founded, when the facts, which juſter obſervations and experience in the right method of treating the worms, have brought to light, are well attended to. It is true, that if the ſame method, with relation to the time of hatching the eggs, &c. was perſued here as in the more ſouthern countries, deſtructive accidents would frequently occur: but it is now well underſtood how to retard the hatching, &c. and keep back the otherwiſe too forward vital progreſs of this animal through its ſeveral ſtages, to accommodate it to the peculiar circumſtances of this climate: by which the

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hazard may be avoided. And if it be ſaid, that, after all, moiſt hot weather will ſometimes kill the worms, the ſame may be affirmed in a greater degree of the ſtrong heats in Piedmont, Lombardy, and other parts of Italy; ſo that the argument deduced from this fact, would prove too much: ſince it would equally or more forcibly operate againſt the practicability of producing ſilk in thoſe countries, where it actually is produced in the greateſt quantities. Theſe tender animals ſuffer in every climate from unfavourable weather; and more generally in ſome ſeaſons in the ſouthern countries than with us, provided we uſe the due precautions; but this is a diſadvantage and not a total obſtacle to the production of ſilk with profit, as we ſee by the abſolute fact itſelf. The principal ground of this opinion, of the unfitneſs of our climate for producing ſilk, aroſe from the improper treatment of the worms here; owing to the ignorance of a better method; as trials made in a more judicious manner, have experimentally ſhewn.

As to the ſecond circumſtance, or *whether the proper food can be provided for ſilk-worms here:* it has alſo been denied, but with leſs foundation than the forgoing. The mulberry-tree, particularly the black kind, the leaves of which are the food of ſilk-worms, flouriſhes as well, and is as hardy here as moſt other trees; and the white kind, though ſomewhat more tender, is yet eaſily cultivated even by ſets or cuttings. But the black affords, in general caſes, as proper food for the ſilk-worm, as the white; and is indeed, in ſome ſilk countries, the kind in common uſe. There is, however, an advantage in intermixing ſome of the white, which is, that the buds open earlier, and the leaves are tenderer, and conſequently furniſh food for the young worms ſooner, and more kindly to them, than the black. As theſe trees can, therefore, be eaſily propagated in any number, here as well as elſewhere, even from cuttings, there can be no want of means of producing food for the worms, and at the ſame expence, as in other places. It muſt be allowed indeed, theſe trees come into leaf

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later here, and consequently do not afford the food so soon as in the southern countries, but the progress of the worm to the state, which renders it necessary, may, as I observed above, be correspondently retarded, and then this objection ceases. There is, moreover, one circumstance peculiarly favourable to us in this point: which is, that the leaves of the mulberry-tree never blight here after the buds are opened: an accident to which they are greatly subject in some of the parts of Europe, where most silk is produced, to the great embarrassment of those concerned in it. In this particular of the provision of food for silk-worms, we stand therefore on at least as good a footing as any of our rivals in it: and consequently no just objection can lie on this head.

As to the third circumstance, *whether the present rate of labour, and other attendant charges, would not raise the expence of producing the silk beyond the due bounds*; it must be admitted, that the whole stress of uncertainty must rest here, and that it is not so easily to be cleared up, as in the other three points. It is by no means, however, evident, that the price of labour would be an invincible impediment to the produce of silk, if we consider, that the far greatest part of the work may be done by women and children, and some of it even by persons aged and infirm. And as, in a great many towns and villages, numbers of hands of this kind, are at present wholly unemployed, they could afford to work at very low rates, and yet with great advantage to themselves. For where persons, whose strength, either in consequence of youth, old age, disease, or want of habit of working, are not fit for common labour, and lie a dead weight on their families or parishes, every constant aid becomes of great consequence to their comfortable and better support. The argument drawn from the high rate of labour does not, therefore, hold good, with respect to undertakings, where those are to be employed, who earn nothing at present: because the price of such labour cannot be taken into the comparison, in this view, betwixt country and

country,

country, as it has in fact no price any where, and this principle is moſt manifeſtly verified, by experience at Birmingham. In that town, great numbers of women, children, and infirm perſons, even moſt of thoſe in the pariſh work-houſe, having been engaged in the manufactures, the undertakers have reduced to a ſurprizing degree the price of every article they have taken in hand. The people of Geneva, one of the cheapeſt and moſt induſtrious places of Europe, were beat by them out of the manufacture of enameled toys, which they had for a long time monopolized: the founding, gilding, and laquering ornamental articles in metal, have been carried by them over all other places in a moſt extraordinary manner, and proves that where waſte hands are employed, the common high rate of labour in the country becomes no obſtacle to the eſtabliſhment of any manufacture. That there is not any want of ſuch hands in moſt places of Great Britain, is too regretfully obvious; and that they may, by proper degrees, be brought to work, where opportunity, example, and encouragement are duly given, is evident from the inſtance of the town here mentioned. The argument, therefore, from the great price of labour in England, againſt the production of raw ſilk, however ſpecious, on a ſlighter view, ſeems to vaniſh, when theſe particulars are brought into conſideration: and perhaps, the dearneſs of all the neceſſaries of life, which tend to the injury of thoſe manufactures, where ſtrong and able hands only can be employed, may, in a ſhort time, conduce to the promoting thoſe, which may be carried on by the weak, and leſs able: as diſtreſs is the moſt fertile parent of induſtry, and even women and children, though habituated to ſloth, may be brought to work, when they can no longer find the means of eating without it. Though there are, indeed, too many inſtances, in ſome counties, which ſhow, that the habit of idleneſs is proof againſt nakedneſs. Mr. Pullen in his ingenious treatiſe, of which it will occur to take further notice below, ſays, that "he "takes it for granted the culture of ſilk-worms cannot

"be

" be performed by the lower claſs of people." But he explains, that he only means, they cannot be undertakers of it, becauſe the worms require proper rooms, fires, mulberry-trees, &c. But this by no means makes againſt their being employed by thoſe who have ſkill to direct them; and a very moderate fund to provide theſe conveniencies. As to the other attendant charges, they would, in a large concern, be very moderate. A plantation of three thouſand mulberry-trees, which might occupy three acres of ground when in maturity, or in proportion while they are younger, would provide for as many worms, as would produce in ſilk of good quality, twelve hundred pounds ſterling in value or upwards. The reſt, beſide the labour, would be ſlight buildings, fire, ſtands, baſons ſet in brick-work, reels, and ſome other trifling implements. But I cannot give a juſter view of the ſmall compaſs, the whole might be reduced to, than by quoting Mr. Pullen's obſervation on this point: who ſays: " When it can " be ſhewed, that two or three large mulberry-trees, or " a proportional number of ſmall ones, will feed a " ſufficient number of worms to make a pound of ſilk: " that the ſtand, which holds theſe worms, will not take " up a yard ſpace in a room: that one perſon, ſkilled " in reeling, can, with the help of a boy to turn the " reel, wind off two or three pounds of ſilk in a day: " that one pound of this ſilk will make near five yards of " paduſoy: that the whole time, from the hatching of the " eggs to the reeling of the ſilk, amounts to no more " than ſix weeks: that a ſmall part of each day is ſuffi- " cient for the proper attendance: and that, beſides all " this, it can be done with much leſs trouble than is " generally undergone. Theſe things, I ſay, being con- " ſidered, and, as I hope, ſhewn in the progreſs of the " inſtructions given in this book, then the managing of " the ſilk-worm will appear in a more inviting light, and " be looked upon as an entertainment, neither unpleaſing " nor unprofitable."

This

This may ſerve to give a general view, how eaſy and moderate the expence of labour, &c. would be, if women and children were employed in a large manufacture of raw ſilk; and how ſmall the other diſburſements would be in proportion to the return: ſo that, perhaps, there is no undertaking of equal conſequence and extent, which could be carried on with a more moderate capital than this.

As to the fourth circumſtance, or *whether the knowledge neceſſary to the performing this matter, as a practical art, is to be obtained here by thoſe, who may be diſpoſed to make ſuch an attempt*, it may be now ſafely anſwered in the affirmative, though till lately great difficulties aroſe on this head; as neither the art of breeding and managing the worms, in a manner ſuitable to this climate, nor that of winding off or reeling the ſilk, were well underſtood. But at preſent the proper treatment of the worms is well known: and not only models of the reel uſed in Piedmont, the beſt hitherto brought into practice, are to be eaſily obtained: but Mr. Pullen has conſtructed a very good one, different from what are in uſe elſewhere, and very well adapted to the purpoſe. He has, alſo, publiſhed a treatiſe on this ſubject, where all the principles are well inculcated, and many juſt inſtructions given for performing the particular offices, both with regard to the treatment of the worms, and the cocoons or ſilk balls. It muſt, indeed, be allowed, that ſome of the methods he teaches, are rather accommodated to the purſuit of this matter as an amuſement, than as an article of commerce; ſuch as hatching the eggs in the boſoms of living perſons, the keeping them in bed-chambers, and the killing the worms by the heat of the ſun, or the ſteam of water; all which, together with the preſervation of a due heat and dryneſs in the room, where the worms are to inhabit, might be performed by ſtoves regulated by thermometers, in large manufactories: but this will be eaſily allowed for by thoſe, who ſtudy his book with a view to applying it to practice in large. This treatiſe, therefore, if well underſtood, will furniſh ſufficient know-

ledge to any intelligent perſon, to begin this work, as to the management of the trees, worms and ſilk; and the Society for the promoting arts, &c. have, in their poſſeſſion, both one of Mr. Pullen's, and one of the Piedmont reels, by which any perſon may, on application, have either kind made. And I doubt not, gentlemen, but that your *Muſeum* will be an open channel of communication, to the diſplaying or removing any difficulties that ſhall offer to ſuch as may engage in this work: as I know ſome gentlemen, who are extremely well verſed in the matter, that will be very ready to lend their aid, by furniſhing all the requiſite information, to any who ſhall publickly call upon them for it.

The practicability of producing ſilk in Great Britain with profit to the undertakers, may therefore be very reaſonably preſumed, from what has been here advanced. But it muſt be acknowledged there are ſome difficulties which ſtand in the way of our expectation, that we ſhall ſoon ſee the matter accompliſhed.

In the firſt place, though it is the pooreſt people, who muſt be employed in this undertaking, as to the actual labour, yet it is by no means they, who muſt begin it. A capital is wanting; and alſo a liberal turn of mind and docility, not belonging to the loweſt claſs of people, to learn a new art, and conduct the ſeveral parts of it, till it is ſo eſtabliſhed, that imitation may afterwards be a ſufficient guide. A plantation of mulberry-trees is firſt requiſite, after that, proper buildings, with the utenſils, and other apparatus for breeding, feeding and preſerving the worms, and for winding the ſilk. For though, after the eſtabliſhment of ſeveral large manufactories of this kind, the production of the cocoons or ſilk balls, and the winding of the ſilk, may be ſeparate undertakings; yet in the infancy of an attempt to produce raw ſilk, and indeed, till conſiderable quantities of cocoons are produced in the ſame neighbourhood, they muſt be carried on conjointly. It is neceſſary, likewiſe, that ſome ſagacious, ſenſible perſon enterprize the ſuperintendance and direction

of

of ſuch a work, till the inferior hands are rendered capable of acquitting themſelves well in their reſpective office; and that extraordinary attendance and care be obſerved, till both the ſkill of performing properly, and habit of attending diligently, are acquired, by all who are concerned in the management of the worms; but, if a number of perſons were once duly initiated into the knowledge, and habituated to the practice, they would ſoon be capable of leading and teaching others.

The reaſons here advanced, for the practicability of producing ſilk in Great Britain, are founded on the ſuppoſitions, that the methods now practiſed are to be perſued. But a much more favourable proſpect of ſucceſs preſents itſelf, when it is underſtood, that very great improvements may be made, in every part of this art, which regards the treatment of the worms, on principles that are inconteſtable. In large concerns, all the diſadvantages, ariſing from change of weather, may be totally removed, and the deſtruction of the worms, from that cauſe, much more effectually provided againſt, than they can in hot countries. Since it is much more practicable to procure a due degree of conſtant equal heat in colder climates, than to prevent too great a one in hotter. By means of tin pipes, diffuſing the moſt regular heat from ſtoves, and of proper ventilators, the air may be always kept of an exact temperature, and yet continually changed at diſcretion, ſo that neither cold, moiſture, nor ſtagnation, may affect the worms: and this may be done with a ſmall comparative expence, either with regard to the conſtruction of the apparatus, or proviſion of fuel. The hatching, and killing the worms, may, in like manner, be performed by ſtoves, with much greater eaſe and certainty, than by any of the methods uſually practiſed. By the ſame means, it is alſo practicable, to have a ſecond product from the ſame breed in one ſeaſon; as well here, as in the ſouthern countries: an advantage never hitherto brought into conſideration by thoſe, who have taken their notions only from a view of the preſent methods, and the

accidents attendant on the natural ſtate of the air in our climate. The certainty with which I ſpeak of a ſecond product the ſame year, is not the reſult of ſpeculation only; but of poſitive information. For a gentleman of unqueſtionable veracity, who reſided ſome time in China; and was at a conſiderable expence in diving into all the myſteries of the Chineſe methods of the treatment of the ſilk-worms, even ſo as to procure operators from a diſtant part of the country, to perform the whole in his own houſe; aſſured me, that they had the art to breed, hatch, and ſet to work the worms, as many times repeatedly in the year, as they choſe, allowing the due time for the progreſſion from the new-laid eggs, to the time of breeding in each ſucceſſion. This gentleman is now abroad; but he told me, before he went, that he had communicated the whole of the Chineſe method, to a very great perſonage, in order to its being rendered of public utility. It is, therefore, to be hoped, the particulars will in due time be laid open, and ſome lights thence gained, that may conduce to the further improvement of this art. The great perfection to which the conſtruction of cloſe ſtoves, conductory warming pipes, and ventilators of every ſize, is now brought, renders the application of proper heat to any of the purpoſes, reſpecting the management of ſilk-worms, much more eaſily and accurately practicable than it would have been formerly: and the improvements of the reel, and the methods of winding off the ſilk, equally facilitate that part of the work to thoſe who are to learn it.

From a juſt view of all theſe circumſtances, it may be reaſonably inferred, that there is no natural nor œconomical cauſe of impediment to the production of raw ſilk in Great Britain, as an article of commerce, and that the importance of ſuch an undertaking is, as above obſerved, ſo great, as to merit every public and private encouragement. It may, nevertheleſs, be objected by ſome, that this article ſhould be left to North America, where the government has appointed aids for it, and where ſome beginnings

have

have been actually made. But to this, I anſwer, that the very ſlow progreſs, or rather the preſent retrograde ſtate of the undertakings there, though puſhed forwards by very extraordinary encouragements, as well from the London ſociety for promoting arts, as the government: who, beſides the giving a large bounty, have erected a public filature, ſhew the great difficulties they labour under; and the little proſpect there is, that the conſumption at home ſhould be provided for from this quarter. Indeed, it ſeems very apparent that this concern is not ſuited to colonies, where there is neceſſarily a want of thoſe unemployed hands, which are alone proper to be employed in it. The number of thoſe poor families, where the women and children live on the earning of one man, paid only as a mere labourer, are very few in ſuch places, compared to what they are with us: and yet the work muſt be done by ſuch women and children, to put the undertaking on a footing with thoſe of other countries, whence we now take the raw ſilk, where this is entirely the caſe. If America, therefore, has ſome advantage in the warmth of the climate, an advantage, perhaps, that does not avail over a proper uſe of ſtoves and ventilators, as above intimated; yet in this other point, of being provided with proper hands, we have an infinitely greater advantage over them: and there can be no reaſon we ſhould neglect or ſacrifice it to the ſpeculation of ſerving them, in a matter where the event is ſo precarious. It would be a great length of time before they could find hands, ſhould they ſucceed at all in this attempt, to produce the great quantity of raw ſilk we uſe in our manufactures, which is indeed ſufficiently large to find work for very great undertakings both there and here. And there is no reaſon of policy, why we, in a matter which may be ſo properly conſidered in the light of a manufacture, ſhould give them the preference.

I have thus endeavoured to evince the reaſonableneſs of the opinion, that the producing raw ſilk with profit in England, is practicable; and to point out the great ad-

van-

vantages of it. I hope it may induce ſome of your public-ſpirited readers, to turn their mind towards it, for the good of their country, and the benefit of their eſtates. For certainly there are many eſtates, where the cottagers, and poor inhabitants in the neighbourhood, who are, in their preſent condition, a load and embarraſſment, might, by being thus employed, become a benefit and convenience. To any who ſhall be diſpoſed to promote this matter, the Society for the encouragement of arts, &c. have ſhewn they are ready to afford aſſiſtance: and I make no doubt, gentlemen, but that you will make your work the channel of communication for any thing that may conduce to the ſame end: and that, more particularly, you will give this a place in the next number you publiſh: which will oblige

Your humble ſervant,

AGRICOLA.

NUMBER XV.

Anſwer to Mechanicus's *Queries concerning the Management of his Farm; and Reflections on the Expedience and Means of improving public Roads, particularly thoſe which are not turnpike: In two Letters to the Editors from* Mago.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I KNOW not if we agree, but I think, I have worked very hard for you; indeed, I begin to be tired, and was forced to ſet a young man to copy over the incloſed long letter; but as I thought it would be acceptable to you and the public, I got it done. As to the other, I think it will be very ſerviceable to Mechanicus, and really he appears ſo very deſerving, from his manner of writing, that I could not withſtand his requeſts.

I wiſh

I wiſh ſome one of you would call at a farmer's, and look at a cutting-box, you will find that all its parts are not deſcribed yet, they have omitted a moſt material one, viz. the *rake* that moves the ſtraw, &c. forward to be cut. Lengthening the handle will be of little or no ſervice, as the cut is nearly up and down. Two knives cannot work, much leſs three. The ſtraw would give way before them. I wonder, Mr. Comber, who is a ſenſible man, would venture to write ſo much of an inſtrument, he now owns he never ſaw or heard of: and the Merchant knows little or nothing of the matter; tho' I could not help laughing at Mr. Comber's recommendation of his contrivance to a Scotch gentleman, becauſe it was like the *Scotch Maiden*. My good wiſhes always attend you.

I am, GENTLEMEN,

Feb. 8, 1766. Your humble ſervant,

MAGO.

Anſwers to Mechanicus's *Queries concerning his Farm.*

GENTLEMEN,

THERE is nothing gives me more pleaſure, than the being as ſerviceable as I poſſibly can; and, therefore, ſince you have given a place to a letter from Mechanicus, p. 289 of laſt Volume, in which he deſires my advice relative to his little farm, I ſhall readily comply with his requeſt; tho', as you juſtly obſerve in your note, it is more a matter of common practice, than ſuch as properly comes within the province of the *Muſeum*: yet as what I have heretofore ſaid on this ſubject, in my letters to Mr. Scott*, and what I may now add in anſwer to Mechanicus, will fully anſwer all ſuch queſtions, unleſs

* Vide Vol. IV. p. 319. and Vol. V. p. 195.

ſome

ſome abler pen comes forth in the cauſe; ſo I the more readily comply with the preſent requeſt.

I cannot help obſerving here, how ſtrangely parents ſometimes act in the diſpoſal of their children in this world. How improperly does Mechanicus appear to be placed? Had a perſon of his genius and abilities been brought up a farmer, it might have been greatly to his own advantage, as well as his country's: yet we find he was put to a laborious trade, to which even his very conſtitution was not adapted. Be wiſer, therefore, O my countrymen! and conſult not only the genius and diſpoſition, but likewiſe the conſtitution of your children in the diſpoſal of them in life.

Mechanicus has given rather an imperfect account of his land; however, he ſays, it is moſtly indifferent, covered with docks and thiſtles; and that the land is light, naturally wet, and poachy. The beſt advice I can give him, is to get rid of his farm as ſoon as he can. For, he ſays, he pays eighteen ſhillings per acre for it, when his neighbours in general pay only nine ſhillings; if he can't get rid of it, he muſt endeavour to get his landlord to contribute to the expence of improving it; or grant him a longer leaſe.

If I underſtand Mechanicus right, he has only one arable field, of three acres, the reſt being graſs land, and all of it over-run with docks and thiſtles. Under theſe circumſtances, his firſt buſineſs is to ſcour out his ditches, to ſink them deeper than they were before, and to give all poſſible vent to the water. After doing this, I would adviſe him to make ſtone drains in thoſe fields that ſeem moſt to require it: and to lead thoſe drains into his ditches. This will be a great improvement to his land *. For, from being wet and poachy, as he deſcribes it, it will ſoon acquire a proper degree of ſolidity: and this is

* It appears to me, that Mr. Randall's new-invented drain-plough muſt be a very uſeful inſtrument in this caſe.

MAGO.

abſolutely neceſſary in order to its being laid down to graſs: for cattle unavoidably do great miſchief to graſs land, when it is ſo wet as to poach. From draining his land in this manner, he will reap another great advantage: which is, that he will be able to plough much earlier in the ſpring, than he otherwiſe could do: and further, his land will be prepared to receive greater benefit from the marl; which, to land naturally light, when the water is diſcharged from it, will certainly be a great improvement. The marl ſhould be laid on, in the autumn and winter ſeaſons, from thirty to ſixty loads or upwards per acre; as he has time and opportunity. A gentleman, in my neighbourhood, has this winter marled an eight-acre field at the rate of one hundred and fifty loads (a three-horſe draught) per acre. The land is a hot gravel; and there can be no doubt but it will be a vaſt improvement to it.

Mechanicus's land, being over-run with docks and thiſtles, muſt be kept under the plough till they are extirpated. Therefore, crops that require, or are improved by horſe-hoeing, will be much the moſt proper: and the frequent ploughings and horſe-hoeings will, at the ſame time, that they deſtroy the weeds, incorporate the marl or clay with the natural ſoil: and bring it to a fine rich mould.

When the land is brought to the ſtate above deſcribed; which may be done in a year and a half, or two years, it may then be laid down to graſs: and, for the methods of doing this, I refer to my letters to Mr. Scott: and to what has been ſaid on the ſubject, by my worthy neighbour, Philogramen*.

The ſoil which comes from ſcouring the ditches, ſhould be carried to a compoſt dunghill, which for this land ſhould conſiſt of ſuch ditch ſcourings, marl or clay, dung, lime, &c. Timothy graſs, from what I know of it, ſeems beſt adapted to land that cannot be drained; if it can, I think there are better graſſes.

* See Vol. V. p. 161.

I ſhould be glad that Mechanicus would allow me to recommend to him Mills's New Syſtem of Huſbandry; a perſon of his genius, will find great entertainment and inſtruction in the matters he inquires after, eſpecially in the firſt and third volumes.

I had wrote the above a few days after I had read Mechanicus's firſt letter, Vol. V. p. 289, when, hoping that ſome gentleman, more able than myſelf, would give him the aſſiſtance he deſired, I laid the paper by; but finding, in your laſt Number, p. 40, that he again calls on me, I could not any longer delay endeavouring to aſſiſt him. During the time that Mechanicus is employed in draining, bringing his land into good tilth, and extirpating the weeds, I agree with Philomath, p. 33, in adviſing him to cultivate ſome of the beſt graſſes in drills, in order to ſupply himſelf with ſeed, to lay his land down with. A gentleman of my acquaintance has a ſmall field, of near an acre, which is laid out with ſeveral graſſes, as flote feſcue, vernal, foxtail, creſted dogs-tail, great and annual meadow, oat graſs, *&c. &c.* they are ſown in drills at about a foot apart; and he thus collects, every year, large quantities of very fine clean ſeed, from the beſt graſſes, free from weeds of every kind, as the intermediate ſpaces are hoed whenever they require it.

I have no doubt, but that a great reformation will be made in a few years, in our meadow and graſs grounds, by following this method of cultivating graſſes; for gentlemen will naturally be lead to gather the ſeeds of any graſs which they find thrives moſt on their particular ſoil, and ſow a few drills in their gardens; by this means they may ſoon be greatly encreaſed, if they are found to anſwer. Drills formed in this manner, I would recommend to be ſown the latter end of July, or beginning of Auguſt, as they may be eaſily aſſiſted with a little water if no rain fall; and the graſs, by ſo doing, will be much forwarded in its growth.

Mechanicus may make a ſummer fallow, or take off a horſe-hoeing crop as he pleaſes. I adviſed the latter to

Mr.

Mr Scott, as being moſt profitable; but when lands work in great clods *, as Philomath mentions, p. 33, it will be very imprudent to ſow it with graſs or any other ſeed. Mechanicus will certainly have the prudence to bring it into good tilth, before he ſows it. I can have no idea of laying down land with natural graſs in drills: and Philomath deſtroys the very end of ſuch ſowing, by directing Dutch clover to be ſown over it in the ſpring following.

Philomath ſeems to ſet light by marl: and "thinks "that a ſummer fallow will intirely anſwer the end, and "at the ſame time *greatly lighten* the ground." Now, it appears to me, that he has forgot Mechanicus ſays his land is *light*, as well as wet and poachy. The latter makes draining neceſſary, if practicable, this will make the land lighter: and to which, good ploughing and horſe-hoeing, will ſtill add; ſo that there can be no doubt, but that marl or clay, will be a great improvement to ſuch land.

I hope, what I have now ſaid will be ſerviceable, and ſatisfactory to Mechanicus. I ſhall be glad to know the ſucceſs that attends it; and it would alſo give me pleaſure

* Strong clays very commonly work in this manner. I ſpent a day laſt ſummer with a gentleman who holds about one hundred acres in his own hands, the land is a very ſtubborn clay. A field of ten acres had been ploughed the day before, and lay like the ruins of a great city: Randal's ſpiky roller was at work upon the field when I was there, it went twice or three times in a place, as the clods required; a plough followed the roller; and when the roller had gone over the field, and came in turn to follow the plough, it was really ſurpriſing to ſee the effect it had on the land. From a heap of ruins, it was reduced to fine mould. I think too much cannot be ſaid in praiſe of this inſtrument upon clay lands. My friend ſaid, it coſt him eight or nine guineas. I wiſh, every farmer on clay land would buy one; and I wiſh, every gentleman of fortune, who is deſirous of encouraging an induſtrious farmer on ſuch land, would make him a preſent of one. Where a pollard oak, and ſhafts can be cut, on the farm, the expence muſt be much leſs. MAGO.

to hear Mr. Scott's ſucceſs. I think he owes me, and the *Muſeum Ruſticum*, that acknowledgement.

I am, GENTLEMEN,

Feb. 5, 1766. Your moſt obedient ſervant,

MAGO.

Expedience and Means of improving public Roads.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN a country dependant on trade, like Great Britain, too much attention cannot be paid to its public roads; nor do I mean merely thoſe roads only which are regulated by particular acts of parliament, and are known as turnpike roads; but alſo thoſe, which are under the direction of general acts, and diſtinguiſhed as pariſh roads. It muſt be needleſs to repeat here, the advantages that ariſe from good roads, as they are numerous and evident: I will, therefore, only obſerve, that on them depend the carrying manure to the land, by leſs ſtrength, and more expedition, and the conveying the produce of thoſe lands to diſtant markets. A moment's reflection will conſequently ſhew the advantages of good roads through the kingdom, to agriculture and trade: for, if we wiſh to ſee our manufactures thrive, we muſt ſupply thoſe who are employed in them with proviſions, on the moſt reaſonable terms, and as they encreaſe, the demand for proviſions will encreaſe alſo; thus trade and agriculture will ever go hand in hand.

I have often been ſurprized, at the little attention given by gentlemen of fortune and liberal education, to the roads in this kingdom. Great improvements, I admit, have been made of late years in the turnpike roads, tho' I think there is yet room for much greater; but the pariſh roads are generally neglected. The ſurveyors there, are moſtly the lower farmers and tradeſmen, who know no more of conſtructing a public road, than they do of Euclid. This leads me to reflect, on the viciſſitudes of things in this

world,

world. How ſtrangely do faſhions alter! A ſurveyor of the roads, *ex officio*, is a very contemptible perſon in our days; but among the Romans, it was an office of the higheſt eſteem; the greateſt men among them thought it an honour. Thus we find, Cæſar was ſurveyor of the famous Appian road or way; Turtullus of the Æmilian road; and Pliny of the Tiber and its banks. Let me flatter myſelf, therefore, that, in this age of enquiry and improvement, gentlemen of property will more and more intereſt themſelves in a matter of ſo much importance to their country, as this branch of civil enquiry will appear to be upon a little reflection.

In order to induce gentlemen, who are inclined to ſerve their country in this matter, I will enter a little further upon the ſubject, as to the methods generally followed in the conſtruction of public roads. Firſt, they may be laid in an undulated or waved form, with an even ſurface, ſo that the wheels preſs equally on every part of the road. Secondly, in an undulated form, with a convex ſurface. And thirdly, in a ſtraight line greatly convex. The laſt is more proper for turnpike roads, where there is ample width; as in that beautiful road, called the city new road, which is conſtructed upon this principle. But the other two are more proper for pariſh roads, which are generally narrow; and in them, if there be room for two carriages, it is ſufficient: though care ſhould always be taken, that there be ſuch width.

Pariſh roads, are not narrow, but generally ſpeaking, more confined, as to the ſun and air, than the turnpike roads: and, therefore, I recommend the undulated form for them: and if they be made ſomewhat convex, or full and round in the middle, I think it the beſt form they can be laid in. But, in making or mending a road, public or private, the firſt thing is to get rid of the water. This muſt by no means be omitted; it is the greateſt enemy you can meet with, and muſt be conquered. The farmers, whoſe land adjoins to the roads, are often very negligent in this reſpect; but you have an act to aſſiſt you, which ſays, "all

"perſons

"persons occupying land adjoining to the highways, shall "scour out their ditches, gutters, and drains: and all "persons having land adjoining to the grounds so adjoin-"ing to the highways, where any ditching or scouring "ought to be, are forthwith to scour their ditches so ad-"joining, that the water conveyed from the highway may "have free passage over the said grounds so next adjoin-"ing." This act must be put in force, without favour or affection to any.

Be assured it is not gravel alone, that will make a good road, let the quantity laid on be ever so great. On the contrary, the whole depends on the manner in which the roads are constructed; and the free vent for the water in the vallies or intermediate spaces. For, I am convinced, that one hundred load of gravel will be of more real service, when properly made use of, than five hundred, laid on by a person unacquainted with the construction of a road. Since if the road lies in such manner, that it cannot vent the water, it will be in the same state, as a stone under the hands of a stone-cutter, who, being supplied with sand, and a small rill of water, will, by means of the friction from his saw, soon work through the largest stones.

From hence it is plain, that a flat or level line is the most improper form for a public road: and that an undulated and somewhat convex line, is very proper for a narrow one. Indeed, there are some roads about London, which are laid, or rather *pretended* to be laid, in this manner; but the waves are so low, and so bounded on the sides by dirt and rubbish, that they are more like a great gutter than a road: and, therefore, generally in the winter season, in a very deep and dirty condition.

Roads that are now flat, may very easily be waved, by sinking the ground for ten, fifteen, or twenty yards: and dividing the earth each way to the center of the intermediate space undug; by which means, they will be waved with ease. The work should be done in the spring, when the dry weather comes on, and graveled in the summer, by which method a road will be made, that with little attendance, will last many years.

I muſt now beg leave to ſay a word or two in regard to *gravel*; which, I think, in many places, the ſurveyors of the roads, both public and private, are at a needleſs expence in ſcreening. I do not doubt, but many of them would prick up their ears at hearing this. I would not have them however be too much ſurprized. I muſt firſt deſire a little chat with them upon the ſubject. For I not only look on it as a needleſs expence; but in many places a detriment to the roads. Providence, who kindly gave us this material for valuable purpoſes, does not leave its works for us to mend. Gravel, in moſt places, is a hard compact body, compoſed of ſmall ſtones ſo fixed in, or bound together, by a kind of bituminous matter, that it is with great difficulty the labourers work into it. Now, by ſcreening, this cement or bituminous matter is ſeparated from it: and the remainder is nothing, but a parcel of ſmall ſtones, which being laid on the roads, neither do, nor can fix or bind, till by the frequent paſſing of heavy carriages, they are ſo ground, as to produce freſh matter to fix in: *which matter* is nothing more than part of the ſtones ground to ſand, *very different* in itſelf, from that cement nature gave with the gravel. To illuſtrate my meaning, let us reflect a moment on the manner in which gravel walks are made. Is it not by gravel carried on as it comes from the pit? Now, if any gentleman, was to attempt to make a gravel walk, with ſcreened gravel, I inſiſt upon it, that if it is rolled to the end of time, it will never be, what we mean by a gravel walk. On the contrary, carry on the gravel as it comes from the pit, with its natural cement or binding particles; and it is well known, how ſolid a ſlight rolling will make it: nay, that even rain, with rolling, contributes to make it more ſo.

I will not ſay, that gravel, in *every* country, is fit to be carried on the roads, without *any* ſcreening. In ſome, perhaps, veins of clay may run among it: and in others, veins of ſand, or too great a proportion of it. This muſt be left to the judgment of gentlemen, in the neighbourhood of the pits; but, ſo much I am confident of, that I

have

have ſeen many gravel pits in this kingdom, where ſcreening was a detriment to the gravel. Another thing, I muſt obſerve, which is, that in general the deeper the labourers dig, the harder, and better is the gravel: and this they all know; but they are not fond of owning it. For the gravel is looſer upon the ſurface, and eaſier dug; but the ſtones are rotten as they term it, ſoon grind to dirt: and ſo require to be renewed in a ſhort time, after they have been laid on. This makes more work, and of courſe increaſes the expence.—Neither are the advantages of digging deep, confined to the getting the beſt and hardeſt gravel, in which the natural cement is found; that makes it bind like a rock. For another advantage would ariſe, which is, that inſtead of running over, and deſtroying ſeveral acres of valuable ground in a few years, half an acre would ſerve for many.

Digging of gravel about London, is four-pence per load; digging and ſcreening nine-pence. Judge, therefore, what a vaſt ſaving here would be on the turnpike roads about London; on which ſuch great quantities of gravel are uſed.

Methinks, I hear ſome honeſt ſurveyor reply, Sir, I admit the truth of what you ſay, as to the ſummer ſeaſon, but it would by no means anſwer for the winter: to this deep reaſoning perſon, I reply, that I would, by no means, have one load of gravel carried on the public roads about London, from the laſt day of September, to the laſt day of February, that is, for five months: and, I hope, I ſhall live to ſee an act of parliament, if it cannot be ſtopped without it, that will forbid gravel being carried on the roads during thoſe five months. I would only allow a few load of ſtones to be ſhot at different parts of the roads, for the labourers to make uſe of, during thoſe months, in caſe of any accident, by the road giving way in any particular place; which, however, will rarely happen, when roads are once properly formed. During thoſe five months, I would have the labourers conſtantly employed in ſhovelling the roads and filling the ruts.

By

By this means, public and private roads will always be neat, and in good order.

Upon the return of ſummer, I would have what has been ſhovelled off in the winter, carried to the ſummit of the waves, and center of the roads: and covered with a coat of gravel: which will bind in ſummer, and become ſo firm by winter, as to diſcharge the water. Thus the roads will always be kept in their proper form, and good condition, at a moderate expence.

I was juſt going to conclude this letter, when a particular friend ſent me—"The report of the committee appointed laſt January, to enquire into the management of ſuch ſums as have been collected for twelve years paſt, by virtue of acts of parliament, for repairing any particular highways,"—the reading of which, gave me great pleaſure. For Mr. Whitworth, who made the report, ſeems to have taken great pains to be well informed: and, as there are ſome things which fully confirm part of what I have ſaid, I muſt beg leave to add a word or two further.—Speaking of a certain great road, he ſays, three thouſand five hundred loads of gravel were laid on a part of the road, which meaſured only *three quarters of a mile*, at an expence of near one thouſand pounds yearly. It alſo appears, that eleven thouſand four hundred and forty-five loads of gravel, are laid on that road, but the diſtance is not mentioned. What ſtruck me much, is the following remarkable words (ſpeaking of this vaſt quantity of gravel) which the committee apprehended, is owing *to ſome of it not lying above a month before it is taken off*. The report alſo ſays, it is neceſſary to prevent, ſuch an amazing quantity of matter, from being continually putting on and taking off by the ſurveyors. Need I now aſk, any reflecting gentleman, what muſt be the conſequence of a road being covered thus by looſe ſtones? muſt they not every hour be reducing to ſand, alias dirt, by the continual paſſing of heavy carriages? or is it unfair, from hence, to infer, that if the gravel be carried on the road, in the ſummer, as it comes from the pit, with its natural cement, the

paſſing of horſes and heavy carriages, eſpecially thoſe with broad wheels, will preſs it down as hard as a rock; by which means, the duſt, in ſummer, will, in ſome degree, be avoided: and by the method I have before mentioned, the dirt in winter?

I think, I have now ſaid enough to convey my meaning to any gentleman, who may chance to read this letter: and, therefore, conclude, with aſſuring them, that what I have ſaid, is not *mere theory*. On the contrary, I am perſuaded from *experience*, with reſpect to a certain road, that what I recommend is right in itſelf.

I am, GENTLEMEN,

Feb. 8, 1766. Your moſt humble ſervant,

MAGO.

NUMBER XVI.

Queries relating to the Society's Premium for a Machine for ſlicing Turneps: And an Account of the Succeſs of an Experiment, on a new Method, of making Hogs grow quickly fat: In a Letter from Mechanicus *to the Editors.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

ON reading Agricola's letter, publiſhed in your laſt December *Muſeum*, No. 68. p. 386. I found a premium offered by that reſpectable, and laudable body, the London ſociety, "That for the beſt cheap machine, for "ſlicing turneps, for the feeding of ſheep and horned cattle, "with greater diſpatch, than by any method now in uſe, "twenty pounds will be given." Revolving in my mind the purport of this advertiſement, I was naturally led into a train of reflection on the nature of a machine, that would ſuit the purpoſe of ſlicing turneps, with eaſe and expedition: and at the ſame time, correſpond with the meaning of the Society's above-mentioned advertiſement, in the cheapneſs and diſpatch neceſſary for ſuch a

machine. As to the firſt requiſite, cheapneſs, the inſtrument I have projected will, I flatter myſelf, anſwer that particular: ſince I think none can be leſs complex, and more cheap: and, if there be no other method in common uſe for ſlicing of turneps than with a knife by hand, as Agricola intimates, I think, I may venture to aſſert, without the leaſt degree of arrogance, that the laſt requiſite, diſpatch, will be found included. For the largeſt turnep may eaſily be ſliced into as many pieces as neceſſary (for the feed of ſheep and large cattle) with one ſtroke of the machine: and the operation effected, by a boy of eight or ten years old: which will, I preſume, be a further recommendation. As I intend to be a candidate for the above premium*, I am very much embarraſſed in what manner I can ſend, and introduce a machine for the notice and conſideration of the Society. I can think of no other method to gain the neceſſary information, but

* We are apprehenſive, that, as Mechanicus's projected machine ſeems adapted only to the ſlicing one turnep at a time, it will ſcarcely come up to the idea and expectations of the Society, with reſpect to that intended by their advertiſement for the premium he mentions: which, as Agricola has explained, in the letter above quoted, calls for ſomething correſpondent to the cutting-box for ſtraw, that would operate on a number of turneps at the ſame time. Though certainly, a ſimple machine, that would cut one turnep at a time into ſlices of a proper ſize, would have ſome utility: as it would be an improvement of the common method of ſlicing turneps, with a knife, by hand. But if Mechanicus be deſirous to become a claimant of that premium, he muſt carry his views further: and, in ſuch caſe, he will have till the laſt Tueſday in November next, to complete and produce his machine: as he will find, on conſulting the advertiſement inſerted page 56 of our laſt number. The manner of producing ſuch machines to the Society, according to the advertiſement, is to ſend them, before the expiration of the limited time, to their office in the Strand: where they are to be delivered to the Society's regiſter. We give this information to Mechanicus, at his deſire, as private members of that Society: for we would, by no means, have it miſtaken, either from the title, or any other occurring paſſage in it, that this work is publiſhed under the direction of the Society, or of any committee appointed by them. R. E. T. H. O. A.

through the channel of the *Muſeum Ruſticum*, and humbly hope ſome of you, gentlemen, with your accuſtomed condeſcenſion, will, in your next publication, allow me a page for this letter; and a few neceſſary directions by way of note, in what manner I can beſt introduce the above machine: and alſo, the time limited for its appearance before the Society. As that particular is not mentioned, in Agricola's letter, the time may be elapſed: and any further application precluded.

I am, GENTLEMEN,

Near Stafford, Your much favoured,

Jan. 11, 1766. MECHANICUS.

GENTLEMEN,

THE ſubject of this letter, was intentionally to have been a part of my laſt, had not the intervention of particular buſineſs obliged me to cloſe it in the manner you received it. I am confident, that many may receive benefit, as well as myſelf, by the following practice in ſimilar caſes. It is very well known, that the feed for hogs has, of late, been remarkably dear, conſequently, moſt, who had it to buy, allowed their hogs leſs time than uſual to compleat their feeding for ſlaughter. This caſe was mine. For I only allowed a midling-ſized *hog*, pretty full in fleſh, five weeks: the firſt and ſecond of which, he eat me a buſhel and a half of peaſe. I perceived him to be very little better, which was owing (as I afterwards found) to his drinking but a very ſmall quantity of *liquid*. As he had now only three weeks to live, I was afraid he would not be fit for the knife at the end of that time, unleſs I could contrive ſome expedient to make him more thirſty; I therefore was reſolved to try the effects of a little ſalt mixed with his peaſe. I did ſo, it anſwered the end, he became prodigiouſly thirſty; and grew in fat ſurpriſingly.

I had him killed at the time propoſed, and the butcher was ſurpriſed at the poſſibility of his being ſo fat, in ſo ſhort a time. I am therefore determined always to mix

a little

a little ſalt with the feed of my *hogs* for the future: being well aſſured, that it will ſave both time and expence: and I dare ſay, thoſe who make uſe of the ſame expedient, will have no juſt reaſon to complain. It would be ungenerous, gentlemen, not to acknowledge that I received this uſeful hint from the *Muſeum Ruſticum*, though on a ſomewhat different application: yet, nevertheleſs, it would appear very ungrateful in me, to receive benefits from your uſeful *fountain of intelligence*, and make no return. Certainly, the Editors of the *Muſeum Ruſticum* have a juſt claim to receive, from their correſpondents, every collateral improvement, conferred on each individual, through the channel of their uſeful *miſcellany*. Mutual advantages are the cement of ſociety, and the diſtinguiſhing characteriſtics of men and manners; conſequently, that man is an unworthy member of community, who makes no returns for acknowledged benefits, ſuitable to his circumſtances and abilities. I am naturally led into this train of reaſoning, by way of apology, for having nothing better to offer in lieu of experienced advantages.

One of you, gentlemen, who ſigns himſelf, O. very kindly ſeems to intimate, that my future correſpondence will not be unacceptable. I am greatly obliged to him for his ingenious compliment, and only wiſh that I had merit and capacity adequate to my inclination.

I cannot cloſe this letter, without firſt paying my ſincere reſpects to your ingenious, and good-natured correſpondent, *Philomath*. It would be ungrateful to with-hold my beſt acknowledgments on this occaſion. I much approve of his inſtructions, and ſhall pay a ſuitable regard thereto. I am, GENTLEMEN, with the ſincereſt inclination,

Near Stafford,
Feb. 9, 1766.

Your devoted humble ſervant,

MECHANICUS.

NUM-

NUMBER XVII.

An Account of the Nature, Culture, and Uſes of Bird-graſs, with ſome Obſervations on the Utility of Burnet, Lucern, Timothy-graſs, and Poa-graſs; and ſome Hints for the Improvement of Ploughs, communicated to the Society for promoting Arts, &c. by Mr. Rocque.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

HAVING preſented the incloſed letter and obſervations on bird-graſs, and ſeveral other articles in huſbandry, to the *Society for promoting Arts*, &c. in order that they may give them ſuch a due ſanction and recommendation to the public, as they may be found to deſerve; and being deſirous, by every means, to render my endeavours uſeful to the world, I here ſend a copy of them to you alſo: hoping that you will, the firſt opportunity, inſert them in your valuable collection; and thereby diffuſe the benefit they may afford among your numerous readers: the only method of rendering diſcoveries in agriculture of general utility being, the making them generally known. Your complying with this, as you have with my former requeſts, will much oblige me.

I am, GENTLEMEN,

Your obedient humble ſervant,

B. ROCQUE.

To the Society for the Encouragement of Arts, Manufactures, and Commerce.

GENTLEMEN,

AS the favour and protection, I have met with in this country, inclines me to exert myself on all occasions in its service: so the particular countenance and generous treatment I have received from your Society, renders me eager to seize every opportunity of presenting my tribute of gratitude to you. Both these motives have had a share in exciting me to make this application. But there is another reason for my addressing myself to you in particular, on this occasion: which is, that it concerns a matter, wherein I consider myself as acting in a trust: and a part of the office of that trust was, to bring the subject before you in due time. But to render this intelligible, give me leave to lay the following circumstances before you. The late Mr. Peter Wych, then chairman of your committee of agriculture, among many other public-spirited endeavours for the improvement of that art, procured from America, the seeds of several various kinds of grasses. In the number of those, was one called *Bird-grass* *, of which he entertained the highest hopes, that it might prove very advantageous to this country. He put an ounce and a half of this seed into my hands, in March 1764, with

* A short account of the bird-grass, and a plate of it, have been before given, in the fifth Volume, No. 9. Page 44. This species of American grass certainly merits the regard of the public here, from that peculiar quality which is apparent in it: viz. its exceeding strong power of vegetation, that renders it capable of supporting itself with vigour on dry land; maintaining its verdure even after ripening its seed; and spreading its roots so fast, as to fill up, in a very short time, every void space of ground near it. If additionally to this important property, the copious production, both of seed and hay, should prove to be, as Mr. Rocque imagines, this grass may be esteemed a very valuable acquisition to husbandry. H. E.

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intent that I might cultivate it: and that we might inform ourſelves of its nature and qualities, in order to bring it properly before you; that, under your ſanction, it might be made known, and rendered uſeful to the public, if it appeared capable of being ſo. This was his deſign: but his death prevented its being carried into execution by himſelf. I have, notwithſtanding, proceeded with the greateſt attention to perform the part which was committed to my care: and having raiſed, propagated, and duly obſerved this graſs, am clearly of opinon, it has ſeveral qualities, that will render it ſerviceable to this country. I have drawn up an account of theſe my obſervations: which I here ſubmit to your conſideration: being confident, your judicious examination will bring to light the true uſe of this graſs, and your high reputation procure the attention of the public to it, if found deſerving, in a much more effectual manner, than my humble endeavours, as a private perſon, poſſibly can do. If, nevertheleſs, it ſhould appear to you, gentlemen, that any thing I can do further, will aſſiſt, in effectuating this purpoſe; I ſhall be proud to receive your commands: being on this, and all other inſtances, ready to prove myſelf, GENTLEMEN,

Your moſt obedient, and moſt
obliged humble ſervant,
B. ROCQUE.

An Account of the Nature, Culture, and Uſes of the Bird-graſs.

IN the month of March, 1764, I received from the late Peter Wych, Eſq; the chairman of the committee of agriculture in the Society for the encouragement of arts, &c. an ounce and a half of the ſeed of a kind of graſs called bird-graſs. He obtained it from Virginia, where it grows, though it is not a native plant. The intention of putting it into my hands was, in order that I ſhould culti-

cultivate it, and be thence able to form a judgment whether it might have any peculiar properties not found in our graſſes, that would render it an advantageous article of culture here. He had, himſelf, conceived a very high opinion of it, by the information he had gained concerning it, from the country whence it came; and intended, as ſoon as he ſhould have due proof from experiment, of what he hoped, to bring it before the Society for the encouragement of arts, &c. who had, with public-ſpirited zeal, entered very minutely into the conſideration of the means of improving paſturage. Being very ſolicitous to acquit myſelf of the truſt, I carefully preſerved this little treaſure till the month of April: which I thought might be a fit time to ſow it. Not being acquainted with the particular nature of this graſs, I prepared the ground for it, in the ſame manner, as I ſhould have done for a flower-bed: raking it with a wooden rake. I did this, as I was willing, by every means, to ſecure its coming up: but ſuch care would not have appeared in the leaſt neceſſary, had I known its great hardineſs, and force of vegetating power, as I have done ſince.

At the time I expected the bird-graſs to riſe from my ſeed, I found the weeds and common graſs coming up very thick: ſo that I could not diſtinguiſh the deſired kind from theſe intruders; particularly the poa-graſs. Being a ſtranger, as I before ſaid, to the appearance of the bird-graſs, I thought it the beſt way to weed out the other graſs and herbs, which I knew, and to let, what I could not diſtinguiſh to be ſo, remain in the ground: and my eagerneſs was ſo great, to perceive, whether the bird-graſs was come up, that I went almoſt every hour to look after it. I diſcovered it at laſt, in about a month from the time of its being ſown, by its having a deeper green hue than is commonly ſeen in our graſſes: and I tranſplanted it, as ſoon as I imagined it would bear moving, into ſome of the ſame kind of ground, as that on which it had been raiſed: having firſt turned it up and cleared it from weeds.

The ſize of this piece of ground, was about twenty rods: part of it a little gravelly, and the other part of it moory land. I ſoon obſerved, the bird-graſs grew better on the gravelly than on the moory part of the ground. That, on the gravelly, being of a better colour and ſweeter than that on the moory; which was pale and yellow. And with reſpect to the moory ground itſelf, one part was moiſter than the other, and the bird-graſs grew better on the drier ſide, than on the wet. The graſs looked well, however, all the ſummer, and, in the month of September following, I began to gather the ſeed, and proceeded in it till October. The product of ſeed was in quantity about twelve pounds.

The firſt year, the graſs did not grow to be above two feet and a half high: but the ſecond, it roſe to be four feet high. On the 14th of June of that year, being 1765, I meaſured out ten rods of this graſs; and cut it. Three days after, I weighed the product of this ten rod, herb and ſeed together; and they amounted to twelve hundred pounds. The 10th of Auguſt following, the ſame graſs was again grown to the height of two feet eight inches, and was a ſecond time fit to cut for hay: but I did not cut it; becauſe, I wanted a ſecond crop of ſeed: which I obtained in the beginning of October; and it proved a much greater crop than the former. About this time, a good deal of rain fell: which occaſioned me no ſmall ſhare of trouble in drying the graſs, and turning the little cocks. I then firſt remarked, that ſhoots were made from almoſt every joint, in conſequence of the moiſture: but, from ſome more than others: and of theſe many were of a finger's length. Had I not ſuffered this graſs to ſtand, that I might ſave the ſeed, I am ſatisfied, I could have mowed it thrice in the year: but wanting to collect as great a quantity, as I could, of the ſeed, I have not yet actually tried that experiment. I am very confident, however, that this kind of graſs may be brought to afford *eight tons of hay per acre*, in the year: and any perſon who may entertain doubts of the reaſonableneſs of

this ſuppoſition, may have them cleared up by ocular proof, if they will take the trouble to call on me; as great numbers of gentlemen have already done, to their intire ſatisfaction in this point. The latter end of May, and the beginning of June, will be a proper time for ſuch inſpection; as this graſs, being a forward kind, will be fit to cut at that ſeaſon.

This graſs has a peculiar quality, different from what is found in any other kind I ever knew before; which is, that it has very ſhort joints, and that every joint ſends out ſhoots, which ſtrike root whenever they touch the ground. On taking a full grown plant of the graſs out of the ground, it will be found, moreover, capable of being divided into twenty ſmaller roots or offsets, proper to be again planted: and theſe offsets, though taken thus from the root, even in the beginning of July, will bear ſeed the ſame year. If, likewiſe, when this graſs is ready to be mowed, there ſhould happen to be much rain, no damage will enſue on waiting a month for fair weather. Becauſe, as this graſs is conſtantly ſending out ſhoots at every joint, it always keeps freſh: and does not wither, nor rot at the bottom, as other graſſes do: but, on the contrary, it continues green, even till the ſeed be ripe: which is certainly a very ſingular property, and of great conſequence.

The goodneſs of this kind of graſs, may alſo be very obviouſly inferred from the following particular. When I firſt ſowed it, which was in the month of April 1764, I had, as I have above declared, only one ounce and a half of the ſeed: but betwixt that time and the preſent, I have found ſuch a ſurpriſing increaſe, that I have collected from the ſucceſſive products of this ounce and half, as much ſeed as has ſown two hundred and fifty acres of land: and have beſides, as much by me, at preſent, as will ſow one hundred acres more.

I ſhall not now dwell any longer, on the commendation of this graſs, than only to ſay, that it has every quality requiſite to make good hay. That it is eaſily propagated, and from a very ſmall proportion of ſeed. That it is not

ſubject to rot, or fail in patches, as moſt other kinds of graſs do. That it is a beautiful green at all times, and conſequently affords a moſt pleaſing verdure, when ſown in ſight of any houſe, or made part of any proſpect. And laſtly, that the produce of hay from it is extremely great: being much more than any other kind of true graſs will yield. Of the truth of all this, many perſons can witneſs, who have, on ſeeing the real trials reſpecting it, given the greateſt encomiums on it. I ſhall, therefore, proceed now to offer ſome directions for its culture.

The ground, on which the ſeed of this kind of graſs is intended to be ſown, is to be prepared in the manner that would be proper for lucern: that is to ſay, it ſhould be well ploughed and harrowed; and cleared as much as poſſible from all weeds, in the ſame way as is done for barley. When the ground is well mellowed and ſweetened, the ſeed may be ſown: the quantity of which may be about one pound and a half per acre; and the time of doing it, from March to April.

Before the bird-graſs ſeed be ſown, it is proper to ſow as much barley, or oats, as will afford half a crop: and ſuch barley or oats being harrowed in, the pound and half of bird-graſs ſeed muſt be ſown over it: after which, in general caſes, the ground is only to be rolled the firſt opportunity, when it is dry. But if the ſoil be ſandy or dry, it may be proper to give it a very light harrowing.

This kind of graſs cannot be well ſown without ſome corn. Becauſe it is of ſo fine and delicate a nature, at its firſt coming up, that the weeds would overpower and choak it, at that time: or a great expence would be neceſſary for cleaning them away by the hand. But, when this graſs is ſo mature, as to be in the ſtate of a paſture, or fit to cut, it grows ſo cloſe and thick, that if a handful of money was thrown up over it, none would, when fallen, I am certain, reach the ground.

As to the nature of the ſoil, proper for the culture of bird-graſs, almoſt every kind will do very well for it; except, as has been obſerved before, ſuch as is too wet or moory;

moory; and this is one of the good properties of this graſs. Becauſe few kinds flouriſh much on dry gravelly ground.

This is a juſt account of the obſervations and experiments, I have hitherto made on this valuable graſs; and they ſeem ſufficient to juſtify me, in endeavouring to render it known to the public, as an object worthy their attention.

Obſervations on the Uſes of the diſtinct Culture of Graſſes, is illuſtrated by Bird-graſs, Burnet, Lucern, and Timothy-graſs.

It has been objected by ſome, againſt the means I perſue in my endeavours to ſerve the public, that I ſtrive to introduce too many ſorts of graſſes, and thereby confound the farmer, in conſequence of the various natures of thoſe I have lately cultivated, and exhibited to the world. To this I anſwer, that it is advantageous to know the different qualities and diſpoſitions, of as many as we can, in order to chuſe the beſt, for each purpoſe, from among them; and underſtand the right method of its ſeparate culture. For, is not all the benefit, which can be expected from the ſeveral common mixtures of graſs in the field, extremely limited and ſmall, compared with that of the beſt kinds, when ſingly cultivated by the moſt improved methods? Let me, therefore, intreat the farmer to make ſuch a trial as this.

Sow four acres of land, with the four following kinds of graſſes. One of *bird-graſs*, one of *lucern*, one of *burnet*, and one of *Timothy-graſs*. Spare no pains, nor expence, to prepare the ground; nor to weed and keep it thoroughly clean and ſweet: for, *No care, no crop*, is a good adage. Let the greateſt attention be had to this, till the cultivated graſſes gain ſufficient ſtrength; and they will then maintain their ground, againſt the encroachment of weeds, by their natural power, without human aid. Spare no pains, nor expence, I repeat; and I deſire no more, in order to be able, from the conſequences, to make good my point, and convince the perſon, who ſets about ſuch a trial, by experience, and the evidence of his own ſenſes. The utility will thence ſoon appear, of multiplying theſe four acres to forty. The taſk of a trial of this kind is not great,

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either from the expence or trouble; and the advantage would, I am ſure, be ſuch, that the undertaker muſt be thoroughly compenſated for his charges, attention, and labour, be they ever ſo great.

If we were to enter into a detail of proof on this head, by inſtances, I could cite ſeveral facts in ſupport of what I have here advanced; but to avoid dilating this account beyond a commodious bulk, I will only introduce one regarding burnet.

The 26th of this month, I went to the houſe of Mr. Baldwin, at Clapham. He was abroad himſelf; but his ſervant told me, that the dairy-maid had turned her maſter's cows, when they were almoſt gone dry, into a piece of *burnet*, during the ſeverity of the froſt; and that the conſequence was, the finding, to the great aſtoniſhment of both the maſter and maid, that the cows, not only ſoon regained their good looks, but gave as much milk, as they had done in ſummer. Whoever has the curioſity, may be ſatisfied of this particular from Mr. Baldwin's own account of it; by applying to him. Had burnet only the two important properties of vegetating in winter, ſpite of the rigorous oppoſition of froſt, and of not only maintaining itſelf, but paying the contribution of a large burthen, when cultivated on poor land, would not they render it of high value? But it has, over and above theſe qualities, others ſtill more beneficial.

As to lucern, I need not mention any thing particular in its recommendation. The great increaſe of the culture of it, within theſe few years, is the ſtrongeſt proof that can be given of its utility: as it is evident thence, how much experience has evinced the benefit of it. I have ſeen it mowed five times in the year, and yield in the whole eight loads of hay per acre. I would not, however, adviſe the mowing it above three times.

I ſhall ſpare ſaying any thing more here, in confirmation of the advantages of the three firſt kinds of graſs, by referring for the further illucidation of their nature and uſes, to a treatiſe publiſhed by me in 1765, and ſold by Mr. Davis in Piccadilly.

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As to bird-graſs, its qualities and hay, have ſuch excellence, that I make no doubt but, in a few years, it will have the preference to all other kinds.

I leave it, therefore, to all impartial judges to determine, whether a collection of ſuch graſſes, as theſe are, will not be of very great advantage to the public; as the ground may, by their means, be brought to afford, at leaſt, three times as much food for beaſts, and of a more kindly nature, than it will by the promiſcuous growth of common field graſſes. The practice of the ſeparate culture of theſe kinds eſtabliſh, likewiſe, a dependance, that there will always be a proviſion for the cattle of good ſweet graſs, without any mixture of bad: and the ſame certainty will alſo accrue, that the milk, cream, and butter, of cows ſo fed, will be wholeſome, well flavoured, and abundant in quantity.

I think a collection of theſe four kinds only, is ſufficient to anſwer all purpoſes whatever; if they were thoroughly underſtood. Some or other of them, are ſuitable to every kind of ſoil. I could find out a much greater number of others, that would likewiſe be really good: but I have been hitherto attentive only to ſelect ſuch as were moſt generally uſeful; to ſtudy the diſpoſition of them, with reſpect to the various natures of the ſoils on which they may be ſown; and to make the ſweetneſs as well of the green herb as hay, and, above all things, the quantity, the objects of my preference. Theſe criterions of goodneſs will, I am ſure, be found in the four, I have thus adopted.

The improvements of paſturage is a very extenſive view; and doubtleſs admits of many other momentous diſcoveries: and if thoſe people, who paſs their time in criticiſing on what others do, were to apply it in actual reſearches on this ſubject, they certainly would find much better employment, and be more ſerviceable to their country.

I muſt beg leave to add one remark, before I conclude. When Mr. Wych put into my hands the ounce and half of bird-graſs ſeed, he told me, he had given parcels of the ſame to many other people. But to this day, I have never been

been informed of one ſingle perſon, who either cultivated, or propagated any of it, but myſelf. So that I may juſtly claim the ſole introducing the culture of this intereſting article into Great-Britain.

A few Hints on Poa or Suffolk Graſs.

The firſt intimation I received, with regard to poa-graſs, was from Windham Boyer, Eſq. He told me, ſheep were exceſſively fond of it: and that he would give five guineas to any perſon, who ſhould procure him a pint of the ſeed. On this recommendation of it, I ſet half a dozen people to work, to gather me ſome of the ſeed: and I computed afterwards, that the expence I was at in collecting it, under theſe circumſtances, was in the proportion of about ſeven ſhillings for a pound of the ſeed. But were it to be gathered in a field, where this herb was the ſole vegetable inhabitant, that expence would be reduced to about eighteen pence.

I ſowed a patch of this poa-graſs, the 6th day of May 1765: and, at the ſame time, cloſe by it, another patch of bird-graſs. The weather was ſo dry, that it was a long time before either of them came up. But at laſt a few plants of both appeared; and produced ſeed the ſame year. The ſeed of the poa-graſs, was ripe about fifteen days before that of the bird-graſs. I gathered the former, and let the other be ſhed.

Some time after, I directed ſome of my people, to weed out the bird-graſs, that was amongſt the poa-graſs. But, by miſtake, they pulled up almoſt all the poa-graſs; which deprived me of the opportunity of making ſuch accurate obſervations, as I wiſhed to have done. However, finding the poa-graſs to be a very forward or early kind, I am taking further pains to make myſelf acquainted with its other qualities. I find it is to be met with in all good lands: and a dwarf kind on the ſides of ditches. When the plants grow ſingly, it will riſe to the height of a foot. I have ſeen ſome of it flouriſhing in the water, from whence a clear inference may be drawn, that it will grow in any

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marſhy land. It is not a property of this graſs to be high: but, it is very thick at the bottom: and I believe it is always in ſap, and keeps continually vegetating. The growth is ſo quick, that it ripens its ſeed the latter end of April.

I am ſtrongly of opinion, this kind of graſs will make a very good paſture for ſheep, but it is not a fit one for mowing. In the application of it to feeding, a ſaving is made from there being no need of manure, as the ſheep is to be kept folded on it. And, in this ſtate, the graſs will always be free from and void of all kinds of weeds. A great expence is conſtantly incurred by gentlemen in laying down avenues, lawns, or bowling-greens. A ſmall quantity of this graſs would intirely anſwer their purpoſe, if the ground were firſt thoroughly prepared. To be convinced of this, let any perſon take the trouble of examining Parſon's green, near Fulham, or the fine patches on Putney common. The verdure will be there found to be all owing to this graſs: and how much finer would it be, if theſe places were not injuriouſly trod by every paſſenger? and if nature alone, under theſe diſadvantages, produces ſuch a pleaſing appearance, would not the effect be rendered very fine by the aid of art, in preparing the ground, and ſecuring the product from the continual depreſſive intruſion of rude feet?

Some Hints for the Improvement of Ploughs.

I have been for a long time inquiſitive to know, whether a plough could not be made in ſuch manner, as to avoid the horſes walking in the furrow? But I met with no ſatisfaction in this point. I ſome time ago aſked a journeyman to Mr. Salkell, a coach-maker at Waltham green, if he could make ſuch a plough. He told me, he believed he could: and that he had made one, which he called a *turn-riſe plough*. On examining it, I found it was not made in the intention here propoſed, nor on the principle above mentioned: but it goes ſo eaſily, that it will do more work with three horſes, than the *ſwin plough* will do with four, being drawn with ſo much leſs power, and turning up the ground better.

The chief remark I made on ſeeing this plough work, was, that there appeared no neceſſity, the horſes ſhould go in the furrow, as they may equally well go on the lands. I aſked the ploughman, whether the horſes could not be brought to keep out of the furrow, and he ſaid, they might be taught to do ſo in a week's time. If that be true, and that this plough can be managed to anſwer in this way, which in my opinion is nearly effected already, it would be a treaſure to the farmer.

The reaſon of my being ſo earneſt to have ſuch a plough, is this, that the horſes, treading in the furrows, make the ground very hard, and this repeated every year, it becomes ſo tenacious in dry weather, that the fibres of the roots of the corn, *&c.* cannot poſſibly penetrate it.

NUMBER XVIII.

Further Reflections on incloſing of Commons, and engroſſing of Farms.

GENTLEMEN,

I Yeſterday read, to my great ſurprize, in the St. James's Chronicle of the day, an excellent letter, in defence of incloſing of commons. My ſurprize was not occaſioned by finding an excellent letter on that ſubject, which is of very great importance to the public, and may, therefore, afford many excellent reflections and aſſertions; but to find it an *original publication* in that place, for it was directly addreſſed as a confutation of the *unſupported*, but *dangerous* aſſertions of a correſpondent of yours, the *old-faſhioned Farmer*. Now my ſurprize aroſe from finding, that this excellent letter was not *originally* addreſſed to you; for as the *poiſon* is in your collection, the *antidote* ſhould have been there too, as one naturally expects from the *candour* and *judgment* of the writer.

I do not pretend, gentlemen, to conjecture with any great degree of confidence, what was the reaſon why the

writer of that letter did not addreſs himſelf to you; but I apprehend, he imagined from your publiſhing the old-faſhioned Farmer's *entêtemens*, that you would not willingly receive his confutation. In this ſentiment however, if he entertained it, he muſt have been miſtaken; for it muſt be acknowledged, that you publiſh *very freely* on both ſides of the queſtion. Your work is indeed chiefly dedicated to *original publications*, addreſſed to you; but the nature of it points out very prudent deviations from this general rule, by republiſhing ſuch pieces, as have a cloſe connection with the ſubjects treated of in your ſeveral numbers; and eſpecially if theſe republiſhed pieces contain ſuch matter as *illuſtrates obſcurities*, or *confutes errors* in the aſſertions of your correſpondents. On this ground, gentlemen, I ſtrongly recommend to you the re-publication of the letter above mentioned, and alſo of another on the ſame ſubject by the ſame hand, publiſhed a poſt or two before in the ſame paper: which I have not ſeen, but ſhould be glad to ſee, if it have *as much*, or *nearly as much*, merit as this which I have read; becauſe, by ſuch re-publication, an excellent piece may be reſcued from its preſent fugitive ſtate, and preſerved *.

* We ſhall always have a pleaſure in complying with any requeſts of our correſpondents, whenever it is not inexpedient. The reaſons here given by Mr. Comber, for the inſertion of theſe obſervations, though before publiſhed, ſeem very good. The ſubject is, at preſent, greatly intereſting; the manner of treating it ſenſible and candid; and we are far from thinking it inconſiſtent with our deſign, or profeſſions, to reſcue, as is here obſerved, any excellent pieces, from that fugitive, or rather ſtill-born ſtate, in which they may be juſtly deemed to be, when publiſhed in journals or daily papers, and to preſerve them in our collection, where they may, on any proper occaſion, be recurred to. We agree, likewiſe, with Mr. Comber, in thinking this more particularly proper, where the pieces contain any anſwers to, or comments on, thoſe which we have publiſhed; as it is our deſire to furniſh the moſt ample information of every ſubject we lay before the public: and as, from the multiplicity of journals, and news-papers, of which in general only one is read by each individual, but a very ſmall part of our readers have the chance of meeting with what is inſerted only in any ſingle paper. R. O.

Your correſpondent, the *old-faſhioned Farmer*, is very violent againſt the *engroſſers of farms*; and I have agreed to condemn them in a *certain degree*, and on *certain occaſions*, and with *certain views*. My chief objections to ſuch engroſſers have always been, that they ſeem *capable*, on *ſome occaſions*, of engroſſing the fruits of the earth, and raiſing the prices to an *unnatural* height; and that as they will be able, from *more extenſive farms*, with *leſs culture*, to maintain their families, and lay up money, they will probably be tempted to beſtow *leſs culture*, and conſequently the public will ſuſtain loſs.

However, gentlemen, I muſt confeſs, that on mature reflexion it appears to me, that conſiderable abatement of the force of theſe objections is to be allowed. For in *many*, perhaps *moſt* caſes, the expences of the great farmers are proportioned to their receipts, and few of them are able to engroſs corn, *&c.* in any very conſiderable quantities. Again, it is as likely (or more ſo) that a *large farmer* may be a *good huſbandman*, as a ſmall one; and when the great farmer has *ſkill* and *activity*, it is as *good* (or *better*) for the public, that he ſhould exerciſe this *ſkill* and *activity* in a *great* as in a *ſmall* farm.

I have met with ſome ſentiments of this ſort in the corner of a *monthly publication*, where they are little *ſeen* and *obſerved*. It ſeems, therefore, on the principles above ſtated, an uſeful work to bring them to more light, by a re-publication in your *Muſeum*, and they are as follow: "A "writer, who ſigns himſelf a citizen of *London*, &c. the "reſentment of the people would ſoon prevent it." See Gentleman's Magazine for laſt month, p. 486.

I am, GENTLEMEN,

Eaſt-Newton, Your moſt obedient humble ſervant,
Nov. 4, 1765. THOMAS COMBER.

Reflections

Reflections on incloſing of Commons, and engroſing of Farms.

To the Printer of the St. James's Chronicle.

SIR,

IF perſons who have incloſed their eſtates, and whoſe advantages may ſuffer ſome diminution by their neighbours following the example, could be ſo mean as to league with thoſe who find their account in a fraudulent or oppreſſive occupation of their open and common rights, it might be ſuſpected that the clamour and riotous behaviour, lately carried to no ſmall degree of violence by the latter, had received encouragement from the former; but I would rather hope, (notwithſtanding ſome uncharitable ſuggeſtions to the contrary) that ſuch perſons of property, who have been inſtrumental in the propagation of prejudices, are really miſtaken in their notions themſelves; and have not either felt the advantages of incloſures, or conſidered the peace and quiet enjoyment of the improved property of their neighbours as incompatible with their own. Cautious, however, every one ſhould be of throwing out inflammatory or fallacious inſinuations, eſpecially amongſt the uninformed multitude, where it is wonderful how great a fire ever ſo ſmall a ſpark kindleth. Although it is not eaſy to acquit ſome late reports of malevolent intention, yet, as many people have, no doubt, been deceived by ſpecious and popular arguments, which they propagate without any ill deſign, and which, nevertheleſs, are ſometimes attended with bad effects, it becomes the office of a good citizen to examine ſuch prejudices with freedom and candor; and inſtead of filling peoples minds with falſe terrors, to endeavour to conciliate them to every ſalutary meaſure; and on all occaſions to aim at the removal of fear where there is no danger. Some of the moſt popular objections to the incloſing of common fields have been conſidered in former letters; and I now would take ſome notice of the accumulation of farms, by ſubſtantial renters, and the conſequential annihilation of the little ones, by which

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ſome people ſeem to be very much alarmed. Overgrown eſtates (as hath already been obſerved) are detrimental to the commonwealth; and overgrown farms may, in ſome degree, be ſo too; but as they are both evils which are produced by the natural courſe of things, ſo they are alſo beſt removed thereby. One is pulled down, and another ſet up, every day. We have ſeen a very few years reduce ſome of the largeſt eſtates in this kingdom, ſo that the houſe laid to houſe, and the land laid to land, are again ſo divided, that they are hardly called by the names of thoſe who collected them. Many ſuch inſtances alſo happen in great farms, which cannot poſſibly eſcape the notice of perſons of obſervation. Enormous eſtates are more dangerous to the public weal than enormous farms; the latter are not increaſed, but the former are *reſtrained* by incloſures. It is evident, that the leſs land a man takes to employ himſelf or his money upon, the more room there will be for others. If a perſon poſſeſſed of money to purchaſe a thouſand acres of open field, can realiſe it in ſix hundred of incloſed land, then it is plain, there are four hundred left for another market. As to farms, the queſtions which reſpect incloſures are, whether the reduction of ſmall ones is a public evil? And whether very large farming is promoted by incloſures? Both which propoſitions I do not ſcruple to deny. By ſmall farms, I mean, *very ſmall ones*, which, indeed, are little better than nuſances, and the nurſeries, or at leaſt the habitations of diſtreſs and beggary; and by large ones, I mean thoſe on the other extreme, which, however, are much more impoliticly demiſed by the landlord, than rented by the tenant, or permitted by the ſtate. Experience will, and, I preſume, hath ſhewed, that the landlord, who lets out his eſtate in the middle way, fares the beſt; and it is not to be feared, but, that from ſuch experience, all public interpoſition will become as unneceſſary, as it would be hazardous, or perhaps in ſome reſpect certainly detrimental. A prudent arrangement of farms with proper proportions of meadow, paſture, and tillage-lands, is not only much

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eaſier made in incloſures than open fields, but (directly contrary to what hath been as confidently aſſerted, as blindly and implicitly received) I think it would be no difficult matter to prove, both from reaſon and experience, that the want of ſuch fitneſs doth naturally bring on an accumulation of farms in open fields; and that incloſures are not only better ſuited for, but do as naturally tend to ſub-diviſion both in farms and purchaſes.

If by * "gentlemen adding farm to farm, all neceſſa-"ries of life are raiſed, common people are ruined, and the "country depopulated," as hath been alledged: if the † "very great progreſs made in incloſing, of late years, doth "contribute to hurt the poor, advance the price of corn, "and depopulate the country," ſuch evils moſt certainly ought to be tolerated: but it ſeldom happens, that a perſon engages in the ſupport of either of theſe charges, but he anſwers himſelf. I have in theſe papers purpoſely avoided controverſy where I could; but I am under ſome neceſſity of obſerving, "that if ‡ butter, pigs, bacon, "cheeſe, and corn, are all made dearer, by the adding "farm to farm," then it muſt be either, 1ſt, That the fruits of the earth are thereby reduced, and leſs quantities raiſed in ſuch farms; or, 2d, That more are conſumed on the ſpot, ſo that of conſequence leſs come to market; or, 3d, That the price of ſuch fruits is artfully and unreaſonably kept up by theſe monopolizers. That the products are reduced, no one will ſay; for though it be obſerved, that, in Warwickſhire eſpecially, "§ it ſeldom happens, "that any great quantity of large farms are kept in til-"lage," yet I ſuppoſe none of the Warwickſhire land in thoſe large farms lies *unemployed*. If corn be dear there, we are told butter, pigs, bacon, and cheeſe, are equally ſo; and we may imagine, from the inſtance given of the increaſed poor's rates at Birmingham, that beef and mutton are not very cheap; ſo that we may reaſonably conclude,

* Muſeum Ruſticum, Vol. IV. No. 1. † Ibid. ‡ Ibid. § Ibid.

that

that the dearneſs ariſes not from any unequal or improper culture: and indeed of our own knowledge we can venture to aſſert, that the products in Warwickſhire have greatly increaſed within twenty years, and more proviſions of all kinds have been raiſed annually in that county than were before the very great progreſs had been made in incloſing. But the argument ought not to reſt on particular examples: we inſiſt, that reaſon and experience prove, beyond contradiction, that the products of the earth (of ſome kind or other) are far from being leſſened by any accumulation of farms. When we hear one perſon complain, that fewer ſheep, *&c.* are kept, and another, that leſs grain is raiſed by means of the incloſing of fields, and the ingroſſing of farms, we may preſume, till the markets in one kind fall in proportion to their riſe in another, that prejudice and error have too much influence on both. The next queſtion is, Whether, in large and incloſed, more proviſions are *conſumed* than in open and ſmaller farms, ſo that leſs proviſion comes from thence to market, although it may happen, that an equal or greater quantity be raiſed therein? But this, and the remaining article, will be conſidered in what follows.

If in the ſecond place we ſay, that in incloſed and great farms more proviſions are conſumed, and of courſe leſs comes to market, we ſhall be in danger of overſetting another argument brought by the *Warwickſhire* * *old-faſhioned Farmer*, viz. that ſmall open field-farms require a larger proportion of hands to manage them; if he had ſaid of horſes too, we ſhould have been far from diſputing it with him. Now, not to dwell upon the number of men, which hath been heretofore ſpoken to, permit me to obſerve, that if the products of an acre of land on a farm, be conſumed by every horſe that is kept for the tillage and management thereof, then for every horſe reduced, the products of an acre of land come to market more than before. Suppoſe that a perſon keeps five horſes to till and manage ſixty acres of open field land (which, ſtrange as it may appear, is well

* Muſeum Ruſticum, Vol. IV. No. 1.

known

known to be done in many places) and that by virtue of an inclosure five such farms are brought into one of three hundred acres, and managed with twice the number of horses; in this case the product of fifteen acres of land, in three hundred, will come to market more than if the field had continued in its open and unimproved state. I do not carry this argument to its utmost extent, because it may, as it stands, be seen and understood at one view, by persons with whom more laboured and intricate reasoning and calculations would, perhaps, be less convincing: and, indeed, without going further, it is very sufficient to shew that more provisions in proportion are consumed upon, and consequently less come to market from small and open, than from inclosed farms. Is then, in the third place, monopolization of provisions peculiar to large and overgrown farms? And are the prices thereof set at the arbitrary direction of two or three growers thereof? This is very popularly alledged; but unless two or three great men could ingross all the lands in the nation, or at least the district of some capital market-town (which I suppose at present we are in no great danger of) it is not to be conceived that it will be in their power considerably to raise the price of provisions of any kind. Nor, indeed, doth the mischief of ingrossing and monopolising lie at the door of the farmer; it is more in the power of one considerable mealman to raise or fall the price of corn, as the circumstances of his stock require, than of the most overgrown farmer in the kingdom. It is exactly the same as to butter, bacon, cheese, sheep, and oxen; the exorbitant prices thereof are never occasioned by, and seldom reach the pocket of the grower. That all necessaries are now dear is indisputable, and that they are equally dear, or nearly so, is as certain; and till the adversaries of new inclosurers can shew that the markets in the neighbourhood of them rise out of proportion to other places in the kingdom; or that one commodity riseth out of proportion to another (as hath been before observed) they will not be able to establish the doctrines they endeavour to inculcate. The rise of the poor's rates, it is ap-

prehended, is a grievance that prevails in all places, and may be rather imputed to the growth of luxury than of induſtry; to the waſte of the common ſtock by an unneceſſary number of hands employed in growing proviſions, than to the increaſe of it, by the improvements in agriculture, commerce, and manufactures. I might aſk, in what places are the poor more burthenſome than in open and common fields? And what buſineſs is more over-handed than ſmall-farming? But inſtead of waiting an anſwer, I will take the liberty to tell the *old-faſhioned Farmer*, that though the luxury of the great, eſpecially foreign luxury, is far from being an inconſiderable cauſe of the diſtreſs of the poor; yet not only tea, but the many other articles of luxury introduced amongſt themſelves, and not only amongſt * *Coblers wives*, but *all* the lower people, deſerves a more ſerious attention than he ſeems willing to give it. As to the deſtruction ſaid to be occaſioned in the families of little farmers, it may briefly be obſerved, that the number of hands neceſſary in agriculture will always be employed therein, either as owners of land, farmers, or labourers; and it cannot be too often, nor too ſtrongly preſſed upon the adverſaries of improvements, that the wealth of the nation doth not conſiſt in the number of the people *unemployed*, or, which is much the ſame thing, employed in doing nothing. An increaſe of people, and an increaſe of employment for them, will naturally follow an increaſe of the fruits of the earth, unleſs any unnatural reſtraints be laid on the means of population. It is very true that on very great farms, and on very great eſtates, many young people of both ſexes, are kept in a ſort of covenanted ſtate of celibacy; and in that reſpect they are (as hath been before admitted) both evils: the one is much more ſo than the other; for ſome married labourers are generally found on the greateſt farms, and would be more, were it not for reſtraints often laid on the tenants in their leaſes, from hiring of ſervants by the year, ſo as to make them ſettlements;

* Muſcum Ruſticum. Vol. IV. No. 1.

and

and from the general effects of the poor laws, and thoſe which in a manner prohibit *matrimony*.

It hath been obſerved by ſome eminent phyſicians, that no medicine is quite ſo innocent, but that if it does no good, it will do ſome harm. There is, in this reſpect, a remarkable analogy between the body natural and the body politick: the conſtitution of the former is more frequently impaired by medicines and quackery, than by the diſtemper itſelf. Nature is obſtructed in throwing off her own incumbrances, by our laying upon her a load that ſhe is unable to bear; by which means, ſmall and tranſcient, or perhaps imaginary diſtempers, are converted into ſuch as are real, permanent, and perhaps incurable. Laws made to remedy evils which never exiſted, or ſuch as the natural courſe of the political ſyſtem would, by degrees, remedy and wear out, are ſimilar in their effects to unneceſſary medicines in the natural body; and, like them too, are ſtill the worſe, if they happen to be of the bold noſtrum, and raſh empirical complexion. No ſcience ſeems ſo univerſally underſtood as phyſic and politics; and as in whatever company you go, it is impoſſible to complain of a diſtemper, or even the apprehenſions of it, without being ſtunned with remedies and preventatives, which, *if they do you no good, can poſſibly do you no harm*; but which no wiſe man will, on the ſtrength of ſuch a character, make uſe of: ſo are we as ſeldom at a loſs for never-failing, and the only true original remedies againſt the diſeaſes of the ſtate, and the maladies, or, more properly, the complaints of the people, whether we talk with ſtateſmen, lawyers, or artificers. He muſt be a cobler, indeed, who does not know how to cure foreſtalling, ingroſſing, and regrating, or who cannot deduce the preſent high prices of proviſions from the accumulation of farms, and preſcribe a cauſtic to eradicate a tumour, that in a reaſonable time would diſperſe of itſelf, and be diſcuſſed, even without the help of a *corn* plaſter. I have therefore admitted, that very great farms have bad tendencies; but even there (to purſue the metaphor) when they come to a head, are ſure to break of

themſelves. I am afraid, that a limitation of them by law, would be attended with much worſe conſequences than can be charged to the account of accumulation; and though farms of a moderate extent are certainly beſt for the public, and for the landlords themſelves, yet no prudent, candid, and diſpaſſionate perſon, I ſuppoſe, would be deſirous of ſeeing unneceſſary reſtraints laid upon the enjoyment of private property, or upon the exerciſe of a right in the owners of land, which any tradeſman would think hard to be deprived of.

The evils enumerated in the preamble of the ſtatute of 25 Henry VIII. and ſuggeſted in many other acts of parliament, a general neglect of tillage, and a conſequent depopulation (the fears of which may poſſibly have been tranſmitted to us by hiſtorians, whoſe reflections better ſuit the times they wrote of, than thoſe they wrote in) are, by the great alterations and improvements made in arts, agriculture, and commerce, become leſs alarming than they were in thoſe days wherein it was the wiſdom of the legiſlature to limit farmers (who kept from four-and-twenty thouſand to fifty thouſand) to the number of two thouſand ſheep, at ſixſcore to the hundred, excepting the owners of land and ſpiritual perſons, who upon their own eſtates were allowed to keep what number they pleaſed. A revival of this, and other tillage-laws, would be abſurd; and the introduction of a new one, to prohibit gentlemen from letting, or farmers from occupying land above a fixed number of acres, or a certain rent, would not only be a dangerous experiment, unſuitable to the conſtitution of the preſent times, but even to the very inconveniences complained of: if the ingroſſing of farms hath demoliſhed hundreds, ſuch an * *Agrarian law* would annihilate its thouſands of farmers; for thus limited in letting, and left at large in the poſſeſſion and occupation of their lands, it would be no unnatural conſequence for perſons of overgrown eſtates to increaſe the number of their bailiffs and ſervants (already perhaps a grievance) inſtead of free te-

* See Muſeum Ruſticum, Vol. IV. p. 4. note marked E.

nants; and for the lands of this kingdom in the hands of ſlaves to become as ill cultivated as thoſe of the Roman republic in a ſimilar ſituation. The great and very remarkable ſtruggle of Tiberius Gracchus to get the famous Licinian law revived, by which no perſon was allowed to poſſeſs more than five hundred acres of land, was brought on from his obſerving that rich people, who at firſt had cauſed farmers, natives of the country, to cultivate their eſtates, had found their account in employing ſlaves for that purpoſe, and from ſeeing himſelf the bad conſequences of ſuch an alteration; for, "in croſſing Tuſcany, in his way "to Numantia, he ſaw the lands lie deſert." And the reaſon given for it is, that "he found no other huſband-"men, herdſmen, and ſhepherds, on them, but ſlaves "from foreign countries."

It is very poſſible that two people may differ in judgment upon very material points, and yet equally wiſh well to their king and country. I hope the open-field freeholder, whoſe queries appeared in the St. James's Chronicle and other papers of the 16th, by entitling himſelf a hearty well-wiſher to both, doth not mean to ſtigmatize the advocates of incloſures with an oppoſite character, by way of putting a ſtop to "thoſe unlawful riots which are always injurious to innocent "families, and to the public, as well as the rioters them-"ſelves *." A ſcarcity, or high price of proviſions, always diſpoſes the lower people to tumults; and artful, nay indeed ſometimes very artleſs, inſinuations direct their fire. A mob raiſed by want of bread, or want of employment, may be managed to overturn a miniſtry, or an incloſure; and either to demoliſh government, or dreſſing mills. I therefore apprehend all inflammatory hints and inſinuations, at ſuch a time, will be carefully avoided by *well-wiſhers*; and I alſo hope (though I muſt confeſs I cannot ſay *upon my own knowledge*) that I herein expreſs the ſenſe of "many thouſands of his majeſty's faithful ſubjects †." The advanced price of bread-corn hath, no doubt, been the occaſion of diſtreſs to many poor families in the king-

* See the queries. † Ibid.

dom;

dom; but if the price doth ariſe from large exportation, and not from real ſcarcity, the price of labour will riſe generally in proportion, and the diſtreſs of the *poor* will not be *aggravated* thereby. The caſe is exactly the ſame with our manufacturers, as they will, on every balance of money in our favour, obtain an higher profit on their wares, and afford greater wages to their workmen. The fact is, that both farmers and artificers have much advanced the price of labour, though perhaps not quite in proportion to the dearneſs of all other proviſions as well as of bread-corn.

The exportation of corn and meal doth certainly raiſe the price thereof, and, in general, greatly to the advantage of this kingdom; and therefore the current of the corn trade, ſhould be as little obſtructed as poſſible, for fear of diverting it into another channel; but certainly our neceſſities are to be firſt conſidered, and a leſs evil endured to prevent a greater. The ſurpluſſages of our products are the ſubjects of exportation. Keep all the corn that is raiſed in the kingdom at home, and the farmer, and perhaps ſome higher, as well as all the lower ranks of the people, muſt return to the food of their anceſtors, who lived almoſt altogether on bread, and therefore became alarmed at the increaſe of paſturage in their times: ſend more out than can properly be called the ſurplus, and a proportionable ſcarcity, as well as an adulteration of what is left, will certainly enſue.

The exportation of corn at the time *when many thouſand acres of land are yearly laid down for graſs* in the new incloſures, is no peculiar diſadvantage; foraſmuch as lands are not incloſed for this or that particular uſe, but to the intent they may be applied to the culture they are moſt fit for, and to the exigencies of the times; which are advantages the public as well as the owners have in lands incloſed, beyond common fields ever tilled and paſtured in one unvaried manner, unleſs it ſhould pleaſe all the freeholders in the open field to conſent to alterations and improvements, which it is obſerved very ſeldom happens. More grain is actually

actually now produced in the new incloſed lands than was when they lay in common fields; and perhaps the large quantity of corn and meal, which the queriſt alledges hath been lately ſent abroad, is no inconſiderable proof of the probability at leaſt of this aſſertion. In the very countries referred to in one of the queries, thouſands of acres, heretofore kept in the ordinary courſe of open-field tillage, under the denominations of one-crop and two-crop land, and which then yielded little or no advantage to the farmer, have, when incloſed and in proper cultivation, not only produced more clear gain than the value of the whole crops which grew thereon did before amount to, but alſo a greater quantity of grain, in one year out of three, than before grew upon them in the whole three years put together. Exorbitant paſturage, and the annihilation or deſtructive reduction of tillage, are ancient and venerable phantoms; but it is abſurd to ſuppoſe a perſon having full power over the land (which the open-field freeholder hath not) will cultivate and uſe it otherwiſe than as the markets, and conſequently his own advantages require.

Though it hath been alledged by ſome, that the fineneſs of our wool is owing, in ſome meaſure, to the ſweet ſhort graſs, on many of our paſtures and downs; and, by others, that feeding the ſheep all the year, without ſhutting them up in folds, is a great advantage both to the ſheep and wool; yet, till lately, I never heard ſuch a ſtrange doctrine ſuggeſted, as that fallow fields, (on which the ſheep are folded) did at all contribute to the improvement of the wool; the fineneſs of which doth not ariſe from the fallow lands, but from the kind of ſheep, on which it grows. Place the weſtern or hill country ſheep, from Weyhill fair, or another ſort remarkable for their fine wool, the black-faced ſheep, bred chiefly in Staffordſhire, commonly called Dudley Cots, in the very ſame fallows or paſtures, with ſheep of an inferior kind, and their wool will be always finer, and of more value by the pound, than their companions: this is notorious; and, I ſuppoſe, every year proved in the inland counties of Warwick,

Oxford,

Oxford, Northampton, and Buckingham. But were it otherwiſe, what will obſtruct the growth of the ſame ſort of wool in the Cotſwold countries, after they are incloſed, as is produced there now? There are two very bad diſtempers which affect the quantity and quality of our wool, the rot and the ſcab. The former is in ſome meaſure, at leaſt, owing to the want of management, and often much prevented by the ditches, drains, and trenches, in incloſures, to the ſpreading of the other (which is infectious) is moſt certainly obviated by keeping the ſheep in ſeparate paſtures; ſo that even this fallow wool, ſo much the object of the queriſt's apprehenſions (though, I ſuppoſe, at this time ſold for three or four ſhillings a tod leſs than fine paſture wool) may be better raiſed, and the ſheep ſafer bred in incloſures, than in the generality, I believe, of open fields; but at all times *as well*.

Fallows are ſo far from mending the quality of wool, that the very ſame ſort and ſize, grown in paſture, being always of a better colour, and cleaner from dirt, ſand, *&c.* than that which is grown and penned in fallow fields, will always ſell for the moſt money.

Obſervations upon Ten Queries, &c. *concluded.*

The ſixth query, I apprehend, does not go at all to the public utility of incloſures. Particular perſons may, through unreaſonable expectation of improvement, ſituation, or of other favourite views, have been diſappointed by an equitable courſe of diſtribution; or perſons of very ſmall property, not content with the improved value of forty or forty-five, or ſometimes even of fifty years purchaſe of their lands, may have embarked in an expenſive incloſure of a few acres, the fences of which have coſt more than the eſtate is worth when incloſed: but I may venture to ſay, that the owners of ninety parts in an hundred of all the lands incloſed, within theſe twenty years, do not repent of their petitions to parliament. But let us turn this query to another inſtitution, and aſk, "Do not "many of thoſe very perſons now feel themſelves injured

"by

" by matrimony, who were prevailed upon to ſign and ſeal, " by falſe appearances, or perhaps the undue influence of " their married neighbours?" And ſhould this be anſwered in the affirmative, I hope the open-field freeholder is not ſo much an old batchelor, as to think of promoting the increaſe and commerce of this nation, by diſcountenancing matrimony. The doctrine ſuggeſted in the ſeventh query is totally indefenſible. Open fields may be as high racked as incloſures; and, if the tenant makes no undue advantages of his ſituation, he may live better on an incloſed farm of fifty or ſixty pounds a year, than upon one of the ſame annual rent, in an open field. On the ſubject of the eighth query, I would obſerve, that it is not the practice of incloſing our open fields, that depopulates the country, and drives the labouring hands into large towns for ſubſiſtence in the manufactures; but the allurements of greater gain and better fare, draw them from the plough and the flail. The manufacturer earns and ſpends double the wages of the labourer in huſbandry. The increaſed number of menial ſervants, now kept in the capital, and other large towns, is another, and a large drain from the country. A lad who uſed to be content with the plain and homely diet of the farm-houſe, and five or ſix pounds a year wages, now pants after the life of idleneſs and luxury, a laced livery, high wages, and card-money: and as ſoon as he has raiſed three or four guineas, in the country, to get inoculated, away he flies to London, or ſome other ſeat of opulence, " in which neither the health, longe-" vity, or increaſe of a country life are, indeed, to be ex-" pected." Inoculation hath, in this ſenſe, depopulated the country more than all the incloſures put together; and yet, I ſuppoſe, no man who hath ears to hear, or eyes to ſee, will be abſurd enough to propoſe a ſtop to be put to this ſalutary practice. To the ninth query, *viz.* " whe-" ther incloſing doth not neceſſarily encourage monopo-" lies," I anſwer in the negative: I have given my reaſons for this opinion, in ſeveral former papers, and ſhall not repeat them now; but only obſerve, that combinations (for a monopoly of land is impoſſible) are as effectually carried

on in open, as incloſed countries; and ſeldom, if ever, begin with the grower of the commodity. As to the tenth query, till it be known what the ſpeedy and reſolute meaſures are, which the gentleman hints at, and whether he writes merely as a freeholder in an open field, I ſhall content myſelf with placing in oppoſition to it, the judicious ſentiments of a modern hiſtorian, and with them I ſhall conclude theſe obſervations: "Theſe abſurd limitations, proceeded from a deſire of promoting huſbandry; which, however, is never more effectually encouraged than by an increaſe of manufactures. For a like reaſon, the law enacted againſt incloſures, and for keeping up farm-houſes (4 Henry VII. cap. xix.) ſcarce deſerves the high praiſes beſtowed upon it by Lord Bacon. If huſbandmen underſtand agriculture, and have a ready vent for their commodities, we need never dread a diminution of the people employed in the country. All methods of ſupporting populouſneſs, except by the intereſt of the proprietors, are violent and ineffectual. During a century and half after this period, there was a continual renewal of laws and edicts againſt depopulation; whence we may infer, that none of them were ever executed. The natural courſe of improvement at laſt provided a remedy *. I am, Sir, yours, &c.

F. B.

NUMBER XIX.

Account of an Experiment made on Hogs, by the Uſe of Sea-Water, under ſome particular Circumſtances.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

BEING lately at a friend's houſe in the country, our converſation turned on agriculture: and the great uſe of the *Muſeum Ruſticum*. A gentleman preſent, who lives near the ſea, obſerved, that in conſequence of ſalt being recommended in one of the Numbers, as uſeful in the fattening cattle, and cleanſing them of their foul humours,

* Hume's Hiſtory of England, Vol. I. p. 65. 4to.

he

he had made a very advantageous experiment. He informed us, that, in ſtormy weather, near where he reſides, there waſhed out a prodigious quantity of ſmall ſtones that had the appearance of ore, when broken. They ſparkled like ſilver, and emitted a ſtrong ſulphureous ſmell. On lying ſome time in the ſea, they gradually diſſolved: and as ſoon as the ſtorm would admit, he ſent for a quantity of the impregnated water: ſome of which he gave every other day to his hogs, mixed with their waſh *.

The days they had this water, they were exceedingly hungry and thirſty, and drank double the quantity of waſh they uſually did when they had not the water; that it purged and rendered them perfectly healthy, and they not only fattened in much leſs time, but the fleſh was remarkably firm, white, and ſweet.

If this information ſhould be of uſe to any of your correſpondents who may be deſirous of trying this experiment, it will give great pleaſure to, GENTLEMEN,

Your conſtant reader, and well-wiſher, R. B.

* It is to be wiſhed, that the gentleman, who made this experiment, had informed himſelf more particularly of what nature this ſubſtance, that reſembles ore, which nevertheleſs diſſolved in the ſea-water, was. Without ſuch information, no certain concluſion, as to that body, can be drawn from his account: the deſcription not anſwering to any known foſſile, or indeed other ſubſtance. We may, however, not unreaſonably impute the effect on the hogs, to the ſalt in the ſea-water, conformably to what Mechanicus has advanced in his letter, inſerted in this Number, p. 116. In that view, this fact may be of uſeful conſideration: as confirming what Mechanicus has aſſerted: and this account further ſhews, what might otherwiſe have been doubted, that, notwithſtanding the hogs ſeem to grow fat, in conſequence of drinking greater quantities of fluid, yet the fat and fleſh are firmer, and better flavoured, than when no ſalt is given to them. Should this uſe of ſalt, or ſea-water, on further trials, prove, as theſe two experiments, (Mechanicus's and this gentleman's) ſuggeſt; and that hogs can be thus fattened, and have their fleſh rendered better, with a great ſaving in the quantity of their food; it will be of very high public utility: and may be deemed an important diſcovery.

At all adventures, we are obliged to this gentleman, for imparting the matter to us, ſince the relation of every extraordinary fact of this kind, has a tendency to the bringing to light principles, that may in the end yield great practical advantages. R. E.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I Have been a purchaſer of your *Muſeum* from the *beginning*, and have read it with much edification; but it was with *particular* pleaſure I obſerved *G. B.* in the poſtſcript to his letter from the Iſle of Ely of Auguſt laſt, promiſed you *their* method of fattening beaſts with oil-cakes; alſo an account of a *better*, *cheaper*, and *quicker* feed, *&c.* I accordingly have *impatiently* expected to ſee it; and if you know that gentleman's addreſs, you will much oblige me if you will write to him, and favour me with the reſult by letter; unleſs you can *conveniently* let it appear in your next (this month's) publication, as I have my reaſons (and thoſe of a very particular nature) for being urgent to know it before *Lady-Day* *. I am, with eſteem,

GENTLEMEN,

Feb. 11, 1766. Your very humble ſervant,

J. H.

* We ſhould be very glad to gratify *J. H.* in his deſire, by writing to *G. B.* if it was in our power. But we are wholly ignorant, how to direct to him; as indeed appears in the blue cover of our laſt Number; where we intimate, that having received a letter of a peculiar nature from *G. B.* which we could not with propriety publiſh, we were deſirous to give our reaſons privately for it to the author, if he would put the means in our power. All we can do, therefore, in favour of *J. H.*'s views, is to inſert his letter here; and leave it to *G. B.* to act as he ſhall think proper with relation to the requeſt it contains. But, we hope, if *G. B.* conſiders what were the contents of the letter, of which we have deferred the publication, he will not let any offence, he may have taken at our behaviour in this particular, be a reaſon for his refuſal. The circumſtances, we ſhould have informed him of, had we known the means of conveying a private letter to his hands, we make no doubt, would have ſufficiently ſatisfied him of the propriety of our conduct; and that it was not the effect of partiality to the perſon whom that letter concerns, or of our want of inclination to oblige himſelf. R. O. A.

Museum Rusticum, &c.

For MARCH, 1766.

VOLUME the SIXTH.

NUMBER XX.

Observations on the Advantages, and an explicit Account of the best Methods, of draining *the several Kinds of* Marshy *and* Moory Lands.

To the Editors of the Museum Rusticum.

Gentlemen,

BEING a constant reader of your *Museum Rusticum*, and having a high opinion of the utility of such a work, I was sorry to find the regular Monthly Publication (for November last) delayed, for * want of a sufficient supply of materials. The following observations are

* We are much obliged to *R. T.* for his generous sentiments with respect to the *Museum Rusticum*. But we have the pleasure of assuring him, the delay, for want of proper matter, was not owing to the loss of correspondence, but to the sudden illness and death of one of the gentlemen assisting in the work; by which means a part of the papers, for the ensuing month, that was in his hands, could not be obtained in due time by the other editors. On the contrary, we have received valuable pieces, and have the assu-

are entirely at your diſpoſal, either for public or private uſe, as to your judgment ſhall ſeem moſt meet. If deſtined (by your candour) for the former, happy ſhall I be, if they prove (in the leaſt degree) uſeful: if (by your friendly judgment) for the latter, moſt thankful, for the kind oblivion beſtowed upon them.

It is with great pleaſure I felicitate my native country, on that happy ſpirit for improvements in agriculture, ſo viſible amongſt all ranks of people, from the firſt nobleman in the land, down to the loweſt farmer. A ſpirit productive of many and great advantages, both to the public, and alſo to private perſons; but to none (in my opinion) ſo particularly uſeful, as to country gentlemen; who, reſiding conſtantly upon their eſtates, without the happineſs of a profeſſion to engage their attention, and employ their leiſure hours, muſt (without a turn to this kind of amuſement) loiter away many dull irkſome days in tireſome indolence; or be liable to that juſt, but ſarcaſtical application of Goliah's curſe, by Mr. Addiſon, "of being given to the beaſts of the field and the fowls of "the air." But this happy turn will furniſh them with an employ, not only very profitable, but alſo rational, innocent, and entertaining. An employ that will make them contributors to the national wealth and proſperity, excellent ſtewards and benefactors to their own eſtates and families, and the trueſt friends to the induſtrious poor. For a conſtant ſupply of labour, is the very beſt relief of *their* neceſſities, and the moſt uſeful way of beſtowing *that kind* of charity. As the profit will be great, ſo will the pleaſure

rances of a future ſupply, from ſeveral perſons of diſtinguiſhed abilities, as well with reſpect to agriculture as other ſubjects, who did not before favour us with their correſpondence.

We muſt acknowledge our further obligations to *R. T.* for this particular communication: which we think highly deſerving a place in any collection, calculated to promote the improvement of land. Inſtructions ſo full and clear, cannot fail to render it ſerviceable to the farmer; and it will have an additional recommendation, to gentlemen, from the liberal ſpirit and manner with which they are delivered. R. E. O. A.

be alſo; eſpecially, from that ſpecies of improvement which I mean to recommend in this letter, viz. *the draining of lands*. For this is ſomething like a new creation (if I may be allowed the expreſſion), when the dreary unprofitable fens, or the ſhaking impervious bogs, where the bittern wont—with bill ingulpht—to ſhake the ſounding marſh—are changed into beautiful meads, verdant paſtures, or yellow harveſts, yielding abundantly the neceſſaries, comforts, and conveniencies of life: to which I may add, how conducive to the healthfulneſs of the ſituation and neighbourhood too, from no leſs authority than Dr. Armſtrong's; who (in his admirable poem, The Art of preſerving Health) gives this excellent advice to thoſe, whoſe lots are fallen in too moiſt a ſoil and clime:

"But if the raw and oozy heaven offend,
"Correct the ſoil, and dry the ſources up
"Of wat'ry exhalation: wide and deep
"Conduct your trenches thro' the ſpouting bog;
"Solicitous, with all your winding arts,
"Betray th' unwilling lake into the ſtream."

So much by way of preface to my ſubject. I ſhall now, in as plain a manner as poſſible, and as conciſe as perſpicuity will allow me, mention the ſeveral kinds of land, upon which I have made experiments in draining; the different kinds of drains I have made uſe of for that purpoſe; and the pleaſing effects, (both as to pleaſure and profit) which I have happily experienced by ſuch practice.

The firſt experiment, I made, was upon a piece of ground (of about four or five acres) in the front of my houſe, of the ſpringy kind; where the waters (collected from the rains and dews in a large plain of dry land above) broke out upon the declivity of the hill; and, not having proper drains and channels to carry them away, had (by long overflowing) rendered the ground ſo ſoft and boggy, as not to allow the tread of any ſort of cattle (unleſs in very

ſcvere froſts); and thereby made it intirely uſeleſs, and alſo very diſagreeable to the eye. I took the opportunity of a very hard and laſting froſt, to carry on a large quantity of ſtones for making the intended drains: which were laid out in the following manner. A main drain, or trench, was made through the middle of the ground, from a ſmall rivulet (into which it was to empty itſelf), to a little above where the ſprings made their firſt appearance: from thence two drains (one on each ſide) were carried along the ſide of the hill to the two extreme parts of the ground, emptying themſelves into the head of the firſt-mentioned drain, which was only made about three feet deep till near the top of it. The branches or ſide drains were better than ſix feet; as I hoped thereby to have cut off all the ſprings: but the declivity of the land being conſiderable, I was obliged to add two drains more below: as ſome of the ſprings had eſcaped under the bottoms of the higheſt branches. I made the drains in the following manner. The bottoms were flagged with a thin tender ſtone (of no other uſe); the ſides walled with rubbiſh ſtone (the walls being about five inches aſunder, and five inches high); and the tops covered with a ſtronger kind of rubbiſh ſtone. Upon the covers, I laid ruſhes and reeds, (the then *only* produce of the ground) to prevent any dirt or ſoil from getting through the openings of them into the drains; and, laſtly, I filled them up with the moſt porous ſubſtances, dug out to near the height of the ſurface.

I began this work about the end of March; and had finiſhed it about the end of Auguſt. I very ſoon found the good effects of my labour, the ground being grown ſo hard and ſolid before the middle of October, that I was able to carry on, *with carts*, a very large heap of compoſt, which I had prepared ready for that purpoſe; conſiſting of freſh litter from the ſtables, virgin earth, ſtreet dirt, coal aſhes, and lime, well incorporated together by frequent turnings. The next ſummer moſt agreeably ſurpriſed me with as fine a crop of hay, both in reſpect of quantity and quality, as any of the neighbouring grounds could boaſt, (above three

loads

loads to the acre): and the aftermath, or ſecond crop, was full as extraordinary as the firſt. In order to know the profit of the latter exactly, I hurdled it off in ſmall parcels: and having taken in cattle by the week, found the profit better than twenty ſhillings a ſtatute acre. This ground has kept improving, ever ſince; and now affords me three crops every year; *viz.* ſpring paſturage for my milch-cows and early feeders, a moſt plentiful crop of good hay, and an excellent aftermath; without having had any ſuperinduction beſtowed upon it ſince the firſt, which is eleven years ago.—When ſtones cannot be conveniently had, the common flat tiles for the bottoms, and the common brick for the ſides, and covers of the drains, will do very well; and, as bricks are more expeditiouſly laid than the rubbiſh-ſtones, I think they will be full as cheap, if proper clay, and fuel for burning them, can be procured upon eaſy terms. The expence of draining this piece of ground, was about five pounds *per* acre. I have drained many acres of the ſame kind of land ſince, with equal ſucceſs; and at a much leſs expence.—Another kind of land, which has fallen within my practice of draining, is what *I call* the ſour ſpongy land; where there is upon the ſurface a tolerable good mould, for ſix or ſeven inches deep, and below that a ſtiff clay, that will not permit any water to paſs through it; by which means, the ſoil above is ſo ſoaked and chilled, with a conſtant ſurcharge of water, that it is not able to produce any thing but ruſhes, and all the worſt ſpecies of aquatic weeds. As this kind of land is often nearly level, or but gently declining, the firſt ſtep I take, is (by levelling) to find the greateſt fall, I can get within any reaſonable diſtance. Then, by the means of iron rods, (ſuch as are uſed in boring for coals) with a bitt or iron ſcoop at the bottom, I try in ſeveral places the depth of the clayey ſtratum, which ſo obſtructs the paſſage of the water; and alſo what the natures of the ſeveral ſtratums below it are, till I come as low as the level, where I propoſe to begin my drain.—If I find, in ſuch ſearch, any gravel, ſand, ſoft rock, pinnel, or other porous ſubſtance, I begin the good work immediately, and

with

with full aſſurance of ſucceſs: making a good ſtone or brick drain (as before deſcribed) through the loweſt part of the ground intended to be drained; and then filling it up with all the light porous ſubſtances, that ariſe in the digging of it, or any rubbiſh that can be conveniently procured; taking great care that none of the clay, or hard ſubſtances, be thrown in again; and that the top and ſides of the drain be left lower than the reſt of the land; that the winter rains may eaſily deſcend to it, and ſo paſs (as through a ſieve) into the channel prepared to receive them.—If there be any low parts in the piece of ground, from whence the rain-water cannot deſcend to the main drain, ſmall pebble, or wood drains, ſhould be made from thoſe low parts into it: taking care to fill them up with ſome rubbiſh or light mould.—The clay, which is dug out, may be converted (either by burning or laying up in heaps with quick-lime) into a moſt excellent tillage, either for corn or graſs-land, for the improvement of the ſame ground, or any other where it is *more* wanted. For the fertility of *ſuch land*, after *ſuch draining*, is greater than can be well imagined by thoſe, who have not tried it, even without any further improvement. I generally (indeed) ſet on lime immediately afterwards, if the ſeaſon of the year be proper for it: which, I ſay (from experience), is from the middle of April, to the middle of July; being certain, (notwithſtanding ſome great authorities, and the common practice are againſt me) that twenty buſhels ſet upon graſs-land, during that ſeaſon, are more than equal to thirty laid on in the autumn, or winter ſeaſons. About an hundred and ſixty buſhels to an acre, are a proper dreſſing.—The laſt kind of land, of which I ſhall now treat, is the *black peat or mooriſh land*; many thouſand acres of which, in this kingdom, are now intirely uſeleſs, tho' capable of being improved to great advantage. Nay, I will venture to affirm, that there is ſcarcely any ſo bad, but that it might (by proper means, and due induſtry) be converted to ſome uſeful purpoſe. For which aſſertion, I have a happy authority, in that beautiful teſtimonial of induſtry, given by Virgil, in his fourth Georgic, to the

old

old Corycian farmer. If theſe kinds of land be nearly upon a level, I uſe the precautions mentioned in the laſt article; and, if I find my level will carry me below, or to the bottom of this black mooriſh or peat-earth, I do not regard the depth of my drains, as the digging is very eaſy, and what is thrown out will nearly pay the expence, by being either dried into peat for fuel, or burnt into aſhes; which (if properly managed) are an excellent dreſſing, either for ſpring-corn, or graſs-land. In the draining of this kind of ground, I make one principal drain through the middle of the piece, (of ſtone or bricks, as before mentioned); and, at about every eighty or a hundred yards, branches from it. Theſe I make rather better than two feet wide at the top; and continue them nearly of the ſame width, till within eight or nine inches of the bottom. Then, with a ſpade (about nine inches broad at the top, and narrowing down to three inches) I make a lower drain; and, upon the ſides or ledges (formed by the narrowing of it), lay large heath-ſods, cut ſquare, and exactly to the width of the upper part: by which means, a cavity is left for the water to run in. Upon thoſe ſods or covers, I throw bruſh-wood, or any kind of light trumpery: and, laſtly, I fill it up with the ſmalleſt of the black ſoil thrown out.—Such is the preſerving nature of this black peat or earth, to all vegetables buried in it, that there is no doubt, but drains of this laſt kind will endure for ever if they be laid deep enough. After the ground is drained and levelled, marl (if to be had near) ſhould be laid on; if not, ſand, gravel, or any kind of light earth. If the firſt, no other ſuperinduction will be required; but if any of the latter, over it, ſhould be ſpread, a cover of ſome of the fineſt black mould, that is pretty free from any ſtrings or fibres; and then a compoſt made of horſe dung, coal aſhes, earth, or clay and lime; and, laſtly, it ſhould be laid down either with graſs-ſeeds alone, or with barley (or oats) and graſs-ſeeds. I laid down a piece (drained and managed as above mentioned) about the beginning of Auguſt laſt, with white clover, yellow clover, and common hay-ſeeds, and though the ſeaſon was ſo remarkably

markably dry and hot, yet the young plants came up very well, and very thick, and, in this preſent ſevere froſt, it affords a verdure, not to be ſeen any where elſe in the neighbourhood; and the piece is conſtantly covered by my cattle, tempted by the look, and the ſweet food it affords them. I am now preparing about five acres of the ſame kind of land, to be laid down with barley and graſs-ſeeds in the ſpring; and hope (if the ſeaſon proves favourable) to have a good crop of both. I had no marl (or even clay) near, ſo was obliged to make uſe of ſand and gravel for my firſt ſtratum *. I have great reaſon to fear I ſhall tire you, gentlemen, with even reading over ſo long a letter: but you know upon what terms you receive it; and, therefore, before I conclude, I will beg leave to mention one other advantage, that may ſometimes be obtained by draining lands, from which there is a pretty good deſcent; which is, that the waters ſo taken away, may be made uſe of for watering ſome dry lands upon the declivities of the bottoms below; and thereby making them amazingly fruitful. This improvement, from watering, was never more effectually proved than in the dry and ſteep hill-ſides near Halifax in Yorkſhire; where a naturally barren and ſhallow ſoil is made to enjoy an early, nay almoſt a perpetual verdure, by the ſole advantage of watering at proper ſeaſons, and with proper quantities.—I have often, with great pleaſure, obſerved, that induſtrious ſet of people, haſting from their looms (their uſual employ); and directing ſeveral little

* I never break any more of the ſurface of this black peat-land than is neceſſary for levelling of it: as the heath and ling prevent the ſtratums laid upon it from ſinking too deep, and alſo the land from poaching with cattle, or cutting up with carriages, till a proper firm ſurface be formed above, and by that time the ling, &c. begin to decay, and turn into a good ſoil.—If the ling or heath be long, I mow it.—Paring and burning are (I know) generally recommended; but the aſhes ariſing from thence are not half ſo good as thoſe, which may be procured by burning the ſolid black earth or peat, which is thrown out of the drains, and from the parts, which are obliged to be taken away in levelling.

bubbling

bubbling ſtreams of water from one part of their little farm to another, where its cooling and friendly refreſhment was moſt wanted: and, I could not upon thoſe occaſions help recollecting thoſe beautiful lines of Virgil:

Et, cum exuſtus Ager morientibus æſtuat herbis,
Ecce, ſupercilio clivoſi tramitis undam
Elicit: illa cadens rancum per levia murmur
Saxa ciet, ſcatebriſque arentia temperat arva.

I hope you will excuſe this inconſequential digreſſion, and believe me to be,

GENTLEMEN,

Lancaſhire, Your conſtant reader,
Jan. 9, 1766. and obedient ſervant,
R. T.

NUMBER XXI.

Two Letters on the Queſtion, Whether the Culture of Burnet be advantageous? Sent in Conſequence of a Deſire, expreſt in one of Mago's *Letters formerly publiſhed.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

MY preſent engagements will not permit me to comply with Mago's requeſt (whoſe ſentiments I properly revere) otherwiſe than juſt informing him and the public, in general terms, without entering into any of the reigning diſputes, or a critical detail; that I have cultivated burnet with attention, due to a plant which promiſed (from various accounts *) ſo valuable an acquiſition in agriculture: but at the ſame time muſt with reluctance

* I have alſo a perſonal knowledge of Mr. Rocque, whoſe attention and perſeverance, in trials of huſbandry, entitles him to public thanks.

confeſs it is not deſerving any exalted character, but rather on the contraay. It is in no degree to be compared in value to the *Trifolium purpureum majus* of Ray; in Shropſhire called the *common clover*, which is cultivated at half the expence, and ſuperior by far in every reſpect; and I hope, there is no doubt, but lucern will merit the regard of the public.

Every new hypotheſis has its florid advocates; but thoſe which communicate to the public through the *Muſeum Ruſticum*, (a work ſo laudably calculated for public utility) ought to be doubly watchful in preſerving ſuch uniform attention, as not to applaud or condemn upon the principle of novelty, when well-tried experiments muſt be the only criterion at laſt from whence we muſt draw our concluſions.

Heretofore I have declared my attachment to agriculture. For amongſt the various branches of knowledge, few can boaſt more rational allurements. Even in the earlieſt time it had its noble votaries; and it ſurely is worthy our admiration and praiſe. It naturally exalts our comprehenſion; and wonderfully raiſes our adoration towards that author, "in whom we live, and move, and have our being."

I am, GENTLEMEN,

Shropſhire, near Shrewſbury, Your humble ſervant,

Feb. 24, 1766. F. R. *

To

* We are obliged to *F. R.* for this communication, in compliance with Mago's requeſt, in his letter, No. 5. p. 265. and are ſatisfied of the truth of what he advances, as far as reſpects his own obſervations and trials. We think it is proper, in all new undecided points, to publiſh every thing that comes with the ſanction of candour and veracity, on each ſide the queſtion. But we are now convinced, nevertheleſs, that the culture of burnet is greatly advantageous, under many circumſtances, and in moſt places. The account given of it by Mr. ——, who cultivated thirty-ſeven acres, and gained the firſt premium for the laſt year from the Society;—that given by Mr. Baldwin, who gained the ſecond premium for cultivating eighteen acres;—and another, given by Mr. Lamb, in a letter to the Society, clearly evince, beyond all doubt, the great utility of this plant properly cultivated.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

NOT receiving your laſt publication till the 15th inſtant, nor that of December till about the ſame time in January laſt, the cauſe of which I ſhall enquire into, as I uſed to receive them by the perſon who diſtributes the Canterbury news-papers in this part of the country, about three or four days after they came out, has put it out of my power to oblige Mago. However, I hope the firſt opportunity to ſend you as particular an account concerning the burnet, as I poſſibly can. In the mean time I wiſh the advocates for, or againſt it, would not be too haſty,

cultivated. We hope the public will very ſoon ſee theſe letters at large: and therefore we ſhall ſay only in brief here on this occaſion, that they ſhow the produce of burnet, both in hay and ſeed, is extremely great; that beſides the hay it affords paſturage, not only in autumn and ſpring, but in the depth of winter;—that it maintains its growth and verdure in the greateſt drought and ſevere froſt;—that in general cattle and ſheep are fond of it, and grow fat by it;—that the milk, cream, and butter of cows, which feed on it, are uncommonly good in quality, and great in quantity: the effects of the burnet in this particular being ſuch, that when the cows are almoſt gone dry in droughty or froſty weather, they are in a few days, by feeding on the green burnet, reſtored to their full meal of milk;—and that burnet will flouriſh and afford large crops on gravelly and ſhaley ſoils, where other kinds of graſſes cannot be made to anſwer. Theſe are qualities of the greateſt importance, and that they exiſt in burnet, is evident from the facts contained in the above accounts, and teſtified likewiſe by many other trials, of which we have authentic information. The laſt of theſe qualities, that is to ſay, the diſpoſition to grow on land ſterile as to the other kinds of herbs, called graſſes, as well the ſeveral true ſpecies as thoſe named ſo from their application to the purpoſe of fodder, is ſo intereſting, that the committee of agriculture have recommended it to the Society to give a future premium for the cultivating burnet on land of the leaſt reputed value. We hope, therefore, our correſpondent *F. R.* notwithſtanding ſome unſucceſsful trials, will ſuſpend his opinion of this plant, till he ſees the letters here mentioned: which we hope will afford him ſufficient ground to think better of it. R. O.

nor too warm. I am inclined at preſent to believe, that it may be propagated to advantage; but as time will not permit me to ſay more, conclude,

GENTLEMEN,

Feb. 22, 1766. Your moſt humble ſervant,

The KENTISHMAN.

NUMBER XXII.

Obſervations on the public Advantages of ſelling Corn by Weight, inſtead of Meaſure.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

YOUR correſpondent *E. S.* after having very clearly proved, not only that the increaſe of the price of corn has not been occaſioned by exportation; but that it has been ſo much reſtrained and leſſened by the bounty, as to be, *communibus annis*, only half the value of other things; modeſtly puts the queſtion, Why the poor are really diſtreſſed, and corn reckoned ſo very dear? I do not look upon myſelf as equal to the anſwer of ſo important a query: but as a ſincere and diſintereſted friend of agriculture, the ſervants, or, conſidering their comparative toil with that of other employments, the ſlaves, I may ſay, of which have been, of late, repreſented as gaining profit beyond their claim, I have taken the liberty of adding my mite of opinion in their defence. A bad harveſt in the year 1764, and a great demand afterwards for wheat abroad, drained us of the very droſs of that commodity, as a community, to a very beneficial degree; for I regard the very lucrative benefits ariſing from exportation, to be ſo greatly ſuperior to the injury now and then done us by the advance from it of the price at home, that, with all ſubmiſſion to the legiſlature, I think it ought to be moſt cautiouſly and tenderly interfered with. The conſequence of this drain was,

that at the laſt harveſt, ſo little old wheat remained, that the new was obliged to be immediately thraſhed: and I ſaw ſome at the millers drying in the air to be hardened for the mill. Yet ſo good and plentiful was this harveſt in wheat, that, in ſpite of the want at home, and demand abroad ſince that time, wheat has from Michaelmas to this time, in this and the neighbouring markets, been, with little variation, at ten pounds *per* load, five quarters to the load. The barley, oats, beans, and peas in this harveſt, were in general ſo extremely bad, as to make a conſiderable deduction upon the profits of the wheat: and, as, in this county, eight pounds *per* load is thought a fair price on all ſides, I believe the additional forty ſhillings *per* load is not more than adequate to the deficiency of the other crops. The profit, therefore, to the farmer this year, is not, upon the whole, above his claim: and the price to the conſumer is leſs, from the greater value of the commodity. Wheat, to be fairly eſtimated, ſhould be valued by the flour it will produce; that is, ſhould be always ſold by weight. The quantity and quality would always then be in the ſame proportion: and the aſſize of bread, or, what is the ſame, the price of flour, would not then be in too high a proportion to that of wheat. Bad wheat will fill the buſhel as well as good: but the weight will be in proportion to the intrinſic goodneſs. The wheat this year is ſo firm, cloſe, full, and heavy, that it is, at the ſame price, one pound *per* load more valuable: and, conſequently, like every other commodity, more cheap than that of laſt year. I heard the overſeer of a work-houſe, in one of the largeſt pariſhes in England, ſay, he was ſurpriſed, how much cheaper it was, from the greater quantity of flour it produced, he maintained his poor cheaper this winter than he did the laſt, though he paid, for his wheat, the ſame price. My concluſion is, therefore, that, by our ſelling wheat by meaſure, and not by weight, and the aſſize of bread being in general regulated by this method of ſale, the poor muſt ſuffer, for the benefit, in ſome degree, of the farmer, if the wheat be bad; and, for the benefit of the miller, in a great degree,

if

if the wheat is good: I ſay, only in ſome degree for the benefit of the farmer, becauſe every miller, like every retail dealer, will very juſtly endeavour to regulate his price by the produce of his commodity, as well as its original wholeſale value.

The millers, I allow, before the laſt harveſt, from the badneſs and price of wheat, could ſcarcely pay their charges; but, at preſent, how much they receive more than their due profit, allowing even for the chance of years, will appear from the following calculation. A buſhel of wheat, at ten pounds *per* load, is five ſhillings: of this the miller makes three pecks of flour, which he ſells for ſix ſhillings and eight-pence: and of the pollard, and bran, makes at leaſt four-pence. Thus one buſhel of wheat, at five ſhillings, is retailed at ſeven ſhillings when ground: and one load of wheat, at ten pounds, is ſold out at fourteen pounds. They are ſo careful of their trade, that of the broad bran, from a gentleman's flour, which they will not dreſs further, they make of their own three ſorts, 1ſt, beſt pollard, ſold at one ſhilling and eight-pence *per* buſhel; 2d, worſt pollard, at ten-pence *per* buſhel; 3d, coarſe bran, at one ſhilling *per* buſhel. Such is their profit when wheat weighs its full weight, that is, when the buſhel is ſixty-five pound; with the ſtill greater addition of more profit, when it overweighs; which the wheat of this year in general muſt conſiderably do. Let the ſaddle then go upon the right horſe. Let not the farmer be thought to grind the poor. Could I joke on ſo ſerious a ſubject, I would ſay, they are ground at another mill. Let no one be able to grind them. Let the weight or goodneſs of wheat determine its price, and ultimately that of the aſſize of bread: and if the poor be not redreſſed, they will be in ſome degree relieved.

To redreſs them at the expence of the farmer alone, is impracticable. He ſuffers with them by the great advance of every other neceſſary, and, of all dear neceſſaries, ſells by half the cheapeſt, while the price of the culture of it is daily increaſing to him. To redreſs them at the expence of the community, would be to attempt an alteration

tion of our manners. As a ſtate we are miſerably poor: as particulars, many of us enormouſly rich; and all of us vain, luxurious, and expenſive. What can be cheap in a country where the public expence is ſo very great; private œconomy ſo very little; and every frivolous art more profitable than ruſtic labour! Proſperity, as the French encomiaſt of agriculture, the Marquis de Mirebeau, obſerves, is to ſtates, as maturity to the fruits of the earth. It not only announces their putrefaction, but renders it almoſt neceſſary. That we may not verify this dreadful but juſt ſentiment; and that your labours may contribute to render the chance of it leſs applicable to this diſtreſt and powerful kingdom; is the ſincere prayer of,

GENTLEMEN,

Eſſex, Braintree, Feb. 17, 1766.

Your friend,
C.

NUMBER XXIII.

Remarks on the Premium, offered by the London *Society, for a Machine for ſlicing Turneps; and* Agricola's *Letter on that Subject, publiſhed in Number* 27.

To Mr. NEWBERRY.

SIR,

UPON looking over the premiums propoſed by the Society for the encouragement of arts, &c. I was not a little ſurpriſed at finding one offered for a machine for ſlicing turneps, it being ſo contrary both to our received notions and common practice in feeding them.

I was in hopes, however, upon ſeeing a letter on that ſubject in your *Muſeum Ruſticum* for *December* laſt from your correſpondent *Agricola*, to have been convinced of its utility; but although I read over his arguments attentively, yet I cannot ſay they gave me the ſatisfaction I expected.

Now

Now if the danger of choaking, as both *Agricola* and Mr. *Baker* agree, ariſes from the ſmall turneps, and none at all from the large ones, I ſhould apprehend the cutting the latter into ſmall pieces, and which may perchance be angular, muſt (as horned-cattle are known to eat very greedily, and to ſwallow their food whole and unmaſticated) rather increaſe the danger, than contribute any way to leſſen it. Accidents however of this kind are not, I believe, very frequent, nor have farmers often ſuffered by them; ſince whenever cattle are feeding upon turneps, there is, for the moſt part, ſome perſon attending upon them; and in caſe of ſuch an accident, they may eaſily be relieved by the aſſiſtance of a rope made for that purpoſe, and which it is always adviſeable to have in readineſs: this, however, I have never had occaſion to make uſe of within the ſpace of three or four years, in which I have fed milch-cows with turneps.

And as to the waſte made of them by fat cattle, whether ſheep or oxen, when given to them whole, that ſeems to me to be rather imaginary than real, ſince what is left by them is uſually eaten up by lean ſtock ſucceeding them. But whatever the waſte may be, it will not, I apprehend, be at all leſſened by cutting them; ſince, when given them abroad in this ſtate, they will be more liable to be dirtied and injured by the weather, than when diſperſed about the paſtures whole. Nor does it appear, that Mr. *Baker* himſelf recommended ſlicing turneps for any other than ſtall-fed bullocks, much leſs for ſheep not under confinement. And indeed it is evident, from the quantity uſed, that he did not prepare them in this manner for all his ſtock, but for that part of it only which was houſed.

Such a machine as this would undoubtedly be worthy the attention of the public, and ſave a great deal of labour, could the expediency of the practice be firſt manifeſted; but as many ſenſible farmers, who have had the largeſt experience in the article of turneps, are no way convinced thereof, yea, rather apprehend the danger of *choaking* would be increaſed thereby, whilſt the expence of providing

thus

thus for a large ſtock (as the labour would be great even with the help of ſuch a machine, and the carriage doubled, by bringing them firſt home to be cut, and then carrying them out to the ſtock) would be much more conſiderable than any ſaving from what might otherwiſe be waſted, this practice is not likely to be generally adopted. Nor is it indeed to be wiſhed it ſhould, ſince it is much more beneficial to the land to feed them where they grow, if the ſoil be dry enough to bear the ſtock, and the weather favourable. So that, upon the whole, if any benefit is likely to ariſe from a machine of this kind, it muſt be wholly confined to ſtall-fed beaſts, and can never, with any advantage, be extended to unhouſed cattle in general.

It is with concern I differ in any thing from your ingenious correſpondent *Agricola*, and with more, that I cannot bring my ſentiments on this head to ſquare with thoſe of the worthy members of the Society above mentioned, whoſe truly laudable and public-ſpirited undertakings I ſhall ever admire, and be a hearty well-wiſher to; but it may, perhaps, be owing to my not ſufficiently comprehending * their ſcheme; which, if it ſhould be the caſe, I ſhall readily, upon a farther explication, retract my miſtake as ſoon as convinced of its being one; who am,

SIR,

Feb. 24, 1766. Your conſtant reader,

NORF-CANT.

NUM-

* We are apt to believe, that our correſpondent, who here ſigns himſelf *Norf-Cant*, does not well comprehend the meaning of the Society, in offering the premium he ſeems to cenſure: and this appears to reſult from his not conſidering the terms of the advertiſement, but confounding with it ſome paſſages in Agricola's letter, publiſhed in Number 28 of our *Muſeum*, which he mentions. Our ground for this conjecture is, that his objections to the premium for a machine, for ſlicing turneps, are drawn from his condemnation to the practice; by which it may be inferred, that he conſiders that the Society's intention, in offering the premium, was to recommend ſuch practice. But that is not the fact. The Society have not propoſed any premium for ſlicing turneps; but

NUMBER XXIV.

Remarks on the Benefit, which would arise from the completing the Catalogue of Engliſh *Weeds, publiſhed in Number* 25 : *With Obſervations on certain Kinds : And on the Advantages of rendering general, through the Channel of the* Muſeum Ruſticum, *uſeful Matters, that may be before known in ſome particular Places only.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I Think the public are much obliged to your correſpondent, who lately gave us a liſt of *weeds*. For, in the *natural*, as well as *moral world*, it is often of as much conſequence, to know what we ſhould *avoid*, as what we

only for the invention of a machine, which will perform that operation with great eaſe and diſpatch : nor have they had it in any manner before them, to decide, whether feeding cattle and ſheep with whole or ſliced turneps in general, or in any particular caſes, was a better practice. The only premiſes requiſite for their conſideration, in order to judge whether the eſtabliſhing this premium was a fit meaſure, or not, were, whether the ſlicing turneps was, or was not a frequent and common practice ; and whether it was not at preſent done entirely by the hand, without the aſſiſtance of a machine ; and of the affirmative of theſe two facts, they had a very ſatisfactory evidence, from many gentlemen of their own body ; who, reſiding occaſionally in various parts of the country, had an opportunity of knowing what was done in them. This being admitted, it was certain that the offering the premium for a machine, which would do this work with great eaſe and expedition, had a manifeſt tendency to procure the means of an advantage to thoſe, who do it at preſent with much trouble, and ſome hazard to their people.

As to *Norf-Cant*'s remarks, on the arguments produced by Agricola, in favour of the practice of ſlicing turneps for cattle, *&c.* we ſhall leave it to Agricola himſelf, to comment on them in his turn, if he thinks proper. For, as to ourſelves, we ſhall avoid interfering in any diſputes reſpecting matter of opinion : unleſs where, by furniſhing accounts of facts, or ſupplying other information, not within the reach of common obſervation, we can materially elucidate any point in queſtion. E. O.

ſhould

ſhould *perſue*; what we ſhould *root out*, as what we ſhould *cultivate*. It has, I think, been ſomewhere obſerved, that the name *weeds* is often *relative*. A plant placed where it ſhould not be, may be a *weed*; but, placed where it ſhould, a valuable *ſubject of cultivation*.

You have juſtly remarked, on your correſpondent's liſt, that it is not ſo perfect *, as one would wiſh; and that a more particular deſcription may make it much more ſo. Good plates alſo ſeem neceſſary. I have been thought, gentlemen, no great admirer of the execution of Mr. *Mills*'s new and complete ſyſtem of agriculture; and, I muſt confeſs, after a fair and laborious examination, I muſt think him an *haſty*, and *very imperfect* compiler, eſpecially when the price of his work is conſidered. Nevertheleſs, as I have always great pleaſure in giving juſt praiſe, I declare, I think, his account of *weeds* is the beſt by far, that I have ſeen.

It would be of great uſe, towards completing an uſeful and perfect liſt of theſe, to collect the various vulgar names, by which the ſeveral ſpecies of weeds go in different counties of *England*; and the different methods of extirpating them.

At preſent, I ſhall only make a few obſervations on two particulars, mentioned by your worthy correſpondent, who ſent you the liſt above mentioned.

I. As to *ſeagrim*, repeated experience convinces me, that pulling up by hand is inſufficient to extirpate it. A quan-

* We have, by no means, ſaid, or intimated, that the liſt of weeds here mentioned is imperfect, with reſpect to what it was intended to be. All that was meant by the words, "But we "think it would contribute much to the advantage, the public "may receive from it, if deſcriptions of the ſeveral plants ſuited "to common readers were to be added, *&c.*" was, that ſuch an addition would be a ſupplemental benefit; though no part of the intention of the ingenious author in the liſt he ſent. It was not, therefore, to point out any defect, in what was already communicated, but to incite him, as he is peculiarly qualified for it, to lend his aſſiſtance in this uſeful addition; which we could not in any other way with propriety aſk, that we dropt this hint. R. E. O.

tity of ſmall roots ſufficient to continue its growth, being left at *almoſt* every trial. I have taken much notice of this weed in ſeveral places, eſpecially where the land is lett dear, ſince I wrote my remarks to you concerning it. This weed grows in many of the grounds about *Leeds* and *Wakefield*; where the land is let for three and four pounds *per* acre *per annum*. I have obſerved, that large bundles of this weed, gathered by hand, are every year ſeen thrown into the lanes; and there appears no diminution of the weed in the paſtures. The ſame may be obſerved of ſeveral of the grounds on that ſide of *York*, which lies towards *Sheriff-Hutton*.

I took notice, however, of one cloſe, which ſeemed wholly free from this deteſtable *weed*, while all thoſe around were full of it. I ſaw the occupier come out of the field, and join me in the high road. Glad of ſuch an opportunity, of information, I aſked him the reaſon of this ſingularity; and though he ſeemed not *very intelligent*, he aſcribed it, to the grounds being for many years a ſheep-paſture: though he added, that ſheep will ſeldom eat this weed, unleſs when they are very *hungry*; and the weed *tender*, viz. in ſpring.

I am not, however, gentlemen, convinced by this inſtance, that ſheep are a *ſovereign cure* for this *evil*; ſince many of the cloſes around that in queſtion, appear to be as conſtantly ſheep-paſtures.

II. As to *heart-clover*, I know not why your correſpondent ſhould make it a *weed*; unleſs in a relative ſenſe: as ſometimes taking up a ſpace, in which a better plant might grow. For, in itſelf, it appears a valuable kind of clover. Mr. *Cook*'s gardener aſſures me, that it is a graſs, of which, both *green* and *dried*, *ſheep* and *horſes* are extremely fond. He has gathered and ſowed ſome of it; and had a prodigious increaſe. He has been ſo good as to communicate ſome of the ſeed to me; and I propoſe to make the trial, and will impart the reſult to you. I wiſh Mr. *Wynne Baker* had been a little more particular in his deſcription of the *ſtrawberry trefoil*, and wiſh him ſucceſs in the culture.

He

He does not ſay what the *colour* of the *flower* is; and, as there is no mention of it in the edition of Mr. *Miller*'s Dictionary, which is by me, I cannot judge whether it is any of the ſmaller kinds of trefoil, which I have deſcribed to you.

Of all the unreaſonable complaints that have been made againſt parts of your work, I think none is *more ridiculous* than that which pretends, that you ſhould not admit accounts of things already well known in ſome places. Whereas, one obvious uſe of your publication is, *effectually to recommend to uſe in places where they are not known, or not ſufficiently noticed and uſed, things, of which the known uſe in other places renders them familiar there.*

I will give you, gentlemen, a ſtrong inſtance in point, as the lawyers ſay.

Who, in the South, and moſt great towns, knows not the advantage of carrying water and milk in buckets, faſtened to the extremities of a yoke, which fitted to the ſhoulders, and bolſtered, enables the labourer to carry a much greater quantity with far greater eaſe? And yet, in all this county, and many others, this method is ſo little regarded, that all the milk and water, except what is carried on aſſes, is carried on people's heads. How many inconveniencies follow hence! The ſtouteſt ſervants, and eſpecially women, complain of this hardſhip: and their maſters never think of a remedy. The danger of throwing down and waſting the liquor, is very great. The injury to the health, and ſtrength of the carrier, is ſtill much greater. The veſſel is uſually raiſed by ſtrength of arms on the breaſt; and then on the head of the bearer. What ſtrains, what head-achs, what pains in the breaſt, hence, ariſe, eſpecially to women, who are frequently moſt unfit for ſuch work! What loſs to the public of healthful breeding wives! A woman ſervant of a tenant of mine, complained the other day, that ſhe muſt either quit her place, or break the *ſkeel*; the veſſel in which water is brought from the well: for it was impoſſible, for her to bring water in a veſſel, which, by continually having water ſoaked into

it, was alone a ſufficient weight. I enquired what quantity of water the veſſel held, and was anſwered by an impartial and ſkilful perſon, "Probably twenty quarts." What a weight, beſides the veſſel itſelf, to be raiſed and carried on the head by a woman! If the farmers would only be at the expence of buying buckets, and a yoke, they would ſoon reimburſe it by the lower wages ſervants would take; and the more work they would get done.

East-Newton, Feb. 23, 1766. I am, GENTLEMEN, as uſual, your's, &c. T. COMBER.

NUMBER XXV.

An Account of the comparative Advantages of cultivating Lucern, on the drill or broad-caſt Methods; for which the Society for promoting Arts, &c. adjudged their Premium of a Gold Medal *.

GENTLEMEN,

THE farm on which the following experiments were made, is a ſtrong clay; a ſoil, in the opinion of all † writers in agriculture, the moſt unfriendly to lucern. Encou-

* The Society for promoting arts, &c. after adjudging their premium of a gold medal, to the gentleman, who ſent this to them, came to a reſolution, to deſire him to publiſh it: which, he accordingly thought fit to do, in the Public Ledger of February 26th. But, in order to render more effectual the views of the Society in procuring ſuch accounts, and for the ſatisfaction or benefit of thoſe of our readers, into whoſe hands the Ledger of that day may not have fallen, which, as they moſtly live in the country, we preſume to be the far greateſt part, we have thought proper to give it a place in our collection, as we ſhall likewiſe from time to time do, with reſpect to any others of a ſimilar nature, publiſhed in the ſame manner. For we think, one of the principal means, of rendering the *Muſeum Ruſticum* beneficial to the public, is the aiding that Society in diffuſing and making general the diſcoveries they may, by their rewards and encouragement, produce or bring to light; it appearing, that, at preſent, they have not any other adequate opportunity of diffuſing a due knowledge of what is communicated to them. R. O. E.

† This gentleman is a little miſtaken in his aſſertion, that in the opinion of all writers, a ſtrong clay is "the moſt unfriendly

"to

Encouraged, however, by M. Lulin de Chateauvieux's experiments, the owner was tempted to try how the lucern would ſucceed when treated in the manner he propoſes: and in the year 1761, he ſowed a field of about three acres with lucern in drills, two feet aſunder. During the firſt year, he cauſed it to be weeded carefully; and from the places where it grew too thick, he ſupplied thoſe in which it had failed. After every weeding, he cauſed the intervals to be ſtirred with a horſe-hoe, reſembling M. Lulin's ſingle cultivator, which manifeſtly revived the plants.

In 1762, the plants throve greatly, being kept clean, and horſe-hoed as in the former year; and the Society having publiſhed a premium for a comparative trial between lucern ſown in broad-caſt and in drills, he determined to try one part of that experiment on this field, and not to beſtow on his lucern any manure whatever, or to give it any other help than the horſe-hoe.

In 1763, the plants were arrived at a ſize to yield ſo full a crop as to maintain five horſes, from the middle of May to the end of autumn, or about five months. Theſe horſes, though conſtantly worked very hard, had neither corn or hay given them during all this time; and yet they con-

" to lucern." For Mr. Rocque expreſsly ſays, in his practical treatiſe on lucern, that it " *will grow very well in clay land, pro-* " *viſo the ground works well.*" And that " *the difficulty* with " relation to ſuch *lands, lies in the harrowing in dry weather, unleſs* " *the ſeaſon betwixt wet and cold be taken,*" to do that office. This difficulty of not being able to hoe or harrow, on account of a long drought, occurred to the gentleman himſelf, who gave this account, in the experiments begun by his gardener, in 1764: as it appears in the ſubſequent part of his account, *that the horſe-hoe could not be made uſe of till late in the year:* and the ſame happened again the next year, when the " *drought of the ſummer kept the* " *clay ſo hard, that the horſe-hoe could not be uſed.*" This account, therefore, agrees perfectly with, and has indeed verified, by the ſtrongeſt inſtances, what Mr. Rocque advanced, with reſpect to the culture of lucern on clayey lands: and beſides what relates to the determining the comparative advantages of the drill and broad-caſt methods, with regard to lucern, it proves evidently, that lucern may be, in ſpite of all theſe difficulties, profitably cultivated in a ſtrong clayey ſoil. E. O.

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tinued in ſtrength and ſpirit, and grew fat. A horſe which in May was ſo weak, and in ſo bad a ſtate of health, that it was thought he could not live, ſoon recovered, when fed with lucern. The plants were in general between three feet and three feet and a half, at the firſt and ſecond cutting. The plants made ſo many ſhoots, and theſe ſhoots branched ſo much, that in three weeks after every cutting, or ſometimes ſooner, the intervals quite diſappeared; the whole field being ſo equally covered, that it looked as if ſown in broad-caſt. December 1763, and January and February 1764, having been uncommonly rainy, the water ſtood in ſome parts of the field; and though there was generally ſuch a declivity as that it might have been carried off, he reſolved to let it remain, in order to ſee what effect it would have on the lucern. When the lucern began to riſe in the reſt of the field, in ſpring, he found, that wherever the water had ſtood, the plants were killed. He ſupplied this loſs by tranſplanting lucern, from other parts; and theſe plants throve very well. By the continuance of the ſame treatment, the lucern remains in a very flouriſhing ſtate: and retained a beautiful verdure and vigour, during the very great drought of this ſummer, 1765. It has yielded four cuttings every year, and ſometimes five.

Having obſerved, in a root of lucern taken up in the winter, that the ſpring ſhoots had no connection or concern with the remains of the ſhoots of the preceding ſummer, but proceeded from numbers of little tubercles, with which the head of the root was ſet very thick; it appeared evident, that the plants could not ſuſtain any damage, though covered with a depth of earth during the winter. This ſuggeſted a hint, that the intervals might be plowed as deep as poſſible early in the winter, turning the earth on the beds; and that, by letting the earth remain in this condition till ſpring, the clay, or ſtrong ſoil in which the lucern grew, would be mellowed, or looſened, by the winter's froſt and rain: and being harrowed ſmooth in February, the freſh lateral roots, ſhot out in the ſpring, would find a fine freſh mould to extend themſelves in, which muſt

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tend greatly to the benefit of the plants. This thought was confirmed by experiment: for the spring crop is amazingly vigorous ever since this practice was followed; and the shoots, though of great length, and most plentifully supplied with branches, are so strong, that no rain or wind lays them, even when they have stood to be in full bloom, as is the case with part of the first crop; the horses not being able to consume the lucern before part of it is necessarily in bloom. Another advantage, arising from this practice, is, that the grass which takes root near the plants, and which cannot be otherwise destroyed but by hand-hoeing, is killed by being so long covered with the earth laid on the beds.

In 1761, a spot of ground, of an exactly similar soil, was inclosed for a kitchen garden; and there being part of it, which was not wanted for other use, in the spring of 1762, it was sown with lucern in broad-cast as a counter experiment to the former. The warmth of the garden, and the partiality of the gardener to this method, who held the field experiments very cheap, gave his lucern every advantage that could be desired. It came up well, and was kept free from weeds; but it neither grew so fast nor so high as the lucern sown in drills. This difference became much more sensible during the second and third years: for, in 1764, the field lucern had got the start of it so far, that this did not rise to half the height, nor did it yield a quarter of the quantity of fodder; so that he thought it needless to prosecute the comparison further *. Seeing so

* This contradicts Mr Rocque's opinion, who plainly says, page 18 of his practical treatise on lucern, that the lucern seed must be sown in *broad-cast, not in drills*; unless, as he says below, "*your spot of land is too small to use a harrow in: in that case, you must sow it in drills*, and keep *it clean hoed*." But Mr. Wynne Baker's account, (see page 334, Vol. V. of this work) entirely confirms what this gentleman's experiments have shewn. For, though the lucern, sown broad-cast, did in Mr. Baker's trial at first seem to exceed that in the drill way, yet the other soon gained upon it, and the broad-cast grew worse in such manner, that he is of opinion, the broad-cast crops will *diminish in proportion*

ſo very remarkable a difference between the lucern raiſed in drills, and that raiſed in broad-caſt, he reſolved to try what ſhare of this advantage might be placed to the horſe-hoe, and what to the diſtance at which the plants ſtood; which diſtance afforded the roots more room to extend in. With this view, in 1764, he ſowed a neighbouring field in rows, two feet aſunder, intending to horſe-hoe one half, and to keep the other free from weeds by hand-hoeing only. The months of April, May, and June, of that year, were ſo dry, that the plants came up thin, and the clay was become ſo hard, that the horſe-hoe could not be made uſe

tion to the improvement of the drill crops; ſo that, in three years, the latter will *treble its own produce of the firſt year, whereas, before that time, the broad-caſt would be near, or quite deſtroyed by the natural graſs:* and this even although *it was managed in the way practiſed by Mr. Rocque.* The difference, in favour of the drill method is indeed ſtronger in this gentleman's experiments than in Mr. Baker's, for, notwithſtanding it was kept *free from weeds* by the gardener, "*who gave it every advantage that could be deſired,*" *it neither grew ſo faſt nor ſo high,* as that ſown in drills, even the firſt year. In the ſecond year, we ſee the difference was ſo much greater, alſo, than Mr. Baker found it in his trials, *that it appeared needleſs to proſecute the compariſon further.* The two accounts do, however, ſo well correſpond, both in the event of the trials, and the reaſon of ſuch event, that they go very far towards proving, that the drill method ought, at leaſt in general caſes, to be preferred to the broad-caſt. It is fair, nevertheleſs, to give the reaſons, on which Mr. Rocque condemns the practice of drilling lucern, in his own words: which are theſe. "I do "not approve of drilling the lucern: becauſe the roots are too "much confined in the drills. They ſay, it is to clean the lu-"cern between the rows, that they drill it; but it is the want "of knowing the nature of lucern: and it diſcourages the people "from ſowing it: drilling and hoeing being very expenſive "ways. The quickeſt and cheapeſt way is to ſow it broad-caſt, "as you do clover; and by much the beſt: as the roots will "ſtand nearly at equal diſtances one from another every way." Mr. Rocque was certainly miſtaken in this notion of the confinement of the roots; and in ſome other particulars: but I have ſeen, on clayey ground, in Northamptonſhire, a crop of lucern in much better condition the third year, though very little pains had been taken with it, than one could well expect conſiſtent with the accounts both of Mr. Baker, and this gentleman who obtained the medal. R.

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of till late in the year. Even with this diſadvantage there was ſeen a manifeſt difference, in favour of the plants that were horſe-hoed. The ſame difference was alſo obſervable in the ſpring of this year: but the uninterrupted drought of this ſummer has kept the clay ſo hard, that the horſe-hoe could not be uſed.

Computing the rent of the land, and the utmoſt expence that can attend the horſe-hoeings, and cuttings, it will be found, that feeding horſes with lucern will be a great ſaving, when compared with the price of the hay and corn, which theſe horſes muſt have neceſſarily conſumed in the ſame time, being kept to equally hard labour.

NUMBER XXVI.

An Account of the Nature, Propagation, Uſes, and very great Advantages of the Italian *or* Lombardy *Poplar.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

SOME time ago, you favoured us, in your moſt uſeful and entertaining work, the *Muſeum Ruſticum*, with the account of a tree called *Robinia*, which may be well ſtiled the vegetable giant of Siberia. As an acknowledgement of the pleaſure, I had in reading that account, and from a motive of good-will to mankind, and to this country in general, I now ſend * you an account of a tree, equally

* We are extremely obliged to our correſpondent, for this communication: eſpecially, ſince it happens to come at a particularly ſeaſonable time: as it affords, both a very material illuſtration, and confirmation, of what Philoſylva has advanced, in his letter, publiſhed in our laſt number, reſpecting the private and public advantage of cultivating quick-growing trees. Indeed this tallies ſo much with the contents of that letter, it might have been reaſonably ſuſpected, that both were written by the ſame hand, or at leaſt by two perſons in concert with

equally curious and useful, and, perhaps, better adapted to the soil and climate of England.

The tree, I mean, is called in France, where it has been but lately introduced, though well-known in Italy, and particularly Lombardy, the *Italian*, or *Lombardy* poplar. According to M. Pelé de St. Maurice, of the Royal Society of Agriculture for the district of Paris, "the tree is "vastly superior, in point of benefit, to all the other kinds "of poplar." He might, I think, have said, superior, in that respect, to almost all other kinds of forest-trees: as must, in my opinion, appear evident from his own account of it; which is as follows.

The Italian, or Lombardy poplar, is of very quick growth, easily multiplied, requires but little trouble or expence; and, in about fifteen years from the planting of it, yields a considerable profit. Other trees scarce begin to appear, when this has done its business, and ceased

each other, if we had not certain proof, that they came from different and distant quarters; and from gentlemen wholly ignorant of each other's transactions; and who, perhaps, have not the least acquaintance.

The reasons which Philosylva has produced, in the letter above mentioned, to show the benefit, the public may receive from the extensive practice of planting, on marshy and waste lands, the quick-growing trees, such as the best kinds of willows and poplars, in the manner recommended by Mr. North, in his pamphlet on grasses and that subject, the tenor of which is greatly verified by this account of the Italian poplar, will, it is hoped, be one means of inducing the Society for promoting arts, &c. to consider of some method of encouraging a matter pregnant with so much benefit to the public. Especially as the private profit, which may accrue from it to the undertakers of such plantations, would, in all probability, render the endeavours of the Society more effectual in this case, than they can be expected to be with relation to the common forest-trees, for which they now offer premiums. A reference was formerly made from that Society, to their committee of agriculture; of the consideration of somewhat of the same nature: but this happening to be in the midst of much other business; and, at the time of year, when the establishment of new premiums is always discontinued, no progress was then made in it: and the matter has slept ever since. E. R. O.

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to exiſt. Theſe poplars are prodigies in nature, which one muſt ſee, to credit their exiſtence. Some of them, at the age of only twelve years, are about thirty inches thick: a ſize, which the other kinds of poplar ſeldom attain to, before the age of thirty. This tree is more beautiful, ſtraighter, and works more kindly than the French poplar. The timber of it is hard, and fit for every kind of carpenter's work. Some perſons go ſo far as to ſay, that it will anſwer for maſts. It is aſſerted, that thirty acres of this tree, fit for cutting, have often been ſold in Italy for ninety thouſand livres (about four thouſand pounds ſterling). Surely this is enough to prove the excellence of this tree above all others. The quick growth, and the great beauty of it, are very conſpicuous on the banks of the canal of Montargis.

The Italian, or Lombardy poplar, has another advantage over other poplars in this, that the branches of it iſſue ſtraight from the very body of the tree; and lie much cloſer to it, than in others, even ſo as to give it a pyramidal form.

It has been ſaid, that the Italian, or Lombardy poplar, is eaſily multiplied. A branch, ten or twelves inches long, and an inch in circumference, fixed in a proper ſoil, will, in three years, become a tree eighteen feet high; and, in the mean time, will ſupply ſhoots enough to ſtock a nurſery.

To form a nurſery of theſe trees, the firſt thing to be done is, to chuſe a rich and freſh ſoil, but not manured: becauſe young trees always thrive the better for being tranſplanted into a better ſoil than that in which they were reared. Beſides, dung generally abounds with large white worms, and other rapacious inſects, to which young trees are an eaſy prey. The end of February is the propereſt ſeaſon, for cutting off the branches to ſtock the nurſery. Theſe branches ſhould be but of laſt year's growth: for older branches are not ſo good. The lower extremities of them ſhould be cut with a ſlope; and a bud be left to each: as it is, from theſe buds, the roots generally ſpring; and, of courſe, the tree may be expected to take the ſooner.

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The holes, to plant theſe branches in, ſhould be twelve inches deep: and the branch ſhould be buried ſo deep, as to be but one or two buds above ground, after the hole has been filled again. The ſhoots of the firſt year are not to be taken off: as they afford nouriſhment to the young tree. The third year, and every year after, the body is to be eaſed of ſome of its loweſt branches: and the ſoil about the roots, ſhould be ſtirred from time to time.

Theſe trees may be tranſplanted from the nurſery into any ſoil, that is not very dry or ſtony. The ſides of rivulets, valleys, and other low grounds, where the ſoil is richeſt and freſheſt, ſeem moſt fit for this purpoſe. The trees there acquire the greateſt beauty. But, in tranſplanting them, care is to be taken, not to bury them above an inch deeper than they were in the nurſery. Many of them have been known to periſh, through the folly and obſtinacy of the country-people, who muſt needs lay the earth about their roots to the height of eighteen inches: whereas ſix inches are fully ſufficient.

Theſe trees will be worth two guineas a-piece, to cut into volutes, at the end of twenty years: ſo that, upon the whole, this poplar, in point of beauty, quickneſs of growth, and goodneſs of timber, would be to farmers an uncommon treaſure. Theſe trees may be cut down twice from off the ſame land, before moſt other kinds of timber-trees can be touched even once.

There are nurſeries of this tree at Montargis, Nemours, Moret, Gron near Sens, and Monbar. The Marquis de Chambray, who has cultivated it, with ſucceſs, at his eſtate of Chambray, near Fillieres in Normandy, takes a particular pleaſure in diſtributing branches to propagate it with.

I am, GENTLEMEN, your's, &c.

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NUMBER XXVII.

Directions for preparing domeſtic Wines, equal to, and reſembling the beſt foreign;—for making a cheap and wholeſome extemporaneous Kind of Small Beer from Melaſſes;—and for improving the Britiſh *Imitation of Rum. With Obſervations on the private and public Utility of making domeſtic Wines*, &c.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS I ſhould be very deſirous to contribute to the ſupport of the *Muſeum Ruſticum*, from which I have received much amuſement, and, as I think, *improvement*, I here ſend you ſome recipes and obſervations, that I flatter myſelf may be uſeful, and conſequently acceptable to part of your readers. I ſay, to part of your readers: becauſe to others, they may poſſibly appear unimportant and trivial. But, agriculture excepted, there are only few ſubjects, which ſuit the taſte of very great numbers of people: and, with reſpect to practical concerns, thoſe, who happen themſelves to be maſters of any particular matter, are apt to ſuppoſe others are equally well acquainted with the ſame: and that no good is, therefore, done to the world, by the publication of it. But in miſcellaneous works, like yours, the multitude muſt, in certain caſes, allow a part to be appropriated to the uſe of the few: by which, each ſet of readers will, in their turn, reap the benefit: and inſtructions for performing, in a perfect manner, things that are of a common and ſimple nature, but not well underſtood in general, may be, in many caſes, of very high utility.

This may be ſome apology for furniſhing your *Muſeum*, with the following directions for making domeſtic wines; a very cheap, wholeſome, and agreeable kind of ſmall beer, and offering ſome hints relative to the improving the imitation of rum, in Great Britain.

As to the art of making wine, I think the rendering it more generally known, and practiſed here, may not only afford a convenience with regard to expence, and a ſecurity with regard to health, to private perſons; but an advantage to the public, in the balance of trade: a principle, at preſent, overlooked: though, in a ſhort time, it will probably be ſeen in a more intereſting light.

I know it will be ſaid, in anſwer to this, that as to the country whence we import a great part of our wine, the balance of trade is, at preſent, much in our favour: and I admit it may be ſo. But this is, probably, true only as to that one country: whereas we purchaſe wine of ſeveral: and I will take the liberty to aſſert, that whatever improvement tends to increaſe the importation of our own produce or manufactures, or to diminiſh the conſumption of foreign commodities in a permanent manner, is neceſſarily conducive to the public good: notwithſtanding any temporary ſpecious reaſons to the contrary. For though it is ſaid, that this has limitations, and ſhould be reſtricted, where the improvements may affect the intereſt of any country with whom we enjoy a beneficial commerce; leſt, by giving umbrage, we may loſe that commerce: yet, I have never been, hitherto, in the leaſt convinced of the truth of this ſpeculation: which, in fact, ſcarcely has better ground than the ſuppoſition of a poſſibility: as there are certainly two things wanting to render this reaſoning juſt, with regard to any particular caſe; the one of which never exiſts at all, and the other very frequently may not. The firſt of theſe things, or that, which, I ſay, never exiſts, is, that the trade of any country with us, ſhould be on a fixt and certain footing, as to the durability of our advantage: and the ſecond, or what may not exiſt in any particular caſe, is, that the reſpective improvement, which may be the object of jealouſy, ſhould be of ſuch a kind, and ſo circumſtanced, as to excite the attention to, or admit the convenience of a change in the general ſyſtem of the commercial affairs of that country with relation to us. For the circumſtances, on which

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mutual commerce is founded, are often ſo complicated in themſelves, and ſo interwoven with the general policy and intereſt of the country, or the court which governs it, that no exterior cauſe can eaſily break the connection. As to the permanency of trade in any particular channel, we ſee nothing is ſo precarious; eſpecially in the preſent conjuncture of affairs in Europe, when every court now makes it the object of attention. We ſome time ago poſſeſſed a very conſiderable trade in the Levant; where we exchanged our manufactures for ſilk, cotton, coffee, drugs, &c. produced there, or brought by caravans from the Eaſt. At preſent, the greateſt part of that trade has left us; and is now carried on by the French; or flows in another current. We enjoyed the Spaniſh trade, likewiſe, with great advantages: much of which, alſo, the French have at preſent: and even the Portugueſe trade, our now greateſt ſource of gain, ſeems not very ſecure to us. Nor does it require great ſagacity, to perceive a great commercial revolution, with regard to our own colonies, coming on very faſt from the increaſe of their manufactures, and their ſpirit of independence. The commercial intercourſe, therefore, with any country, is too ſenſibly fluctuating, to render it prudent to give up any domeſtic advantages of a perpetual nature to ſuch ſpeculative views, and the moſt certain means of making the balance of trade turn in our own favour, is, to leſſen the national expence, by producing or manufacturing within ourſelves, as many of the material articles of our conſumption as we can. On this principle, therefore, as well as ſome others, I ſhall think, I am doing a ſervice to the public, if I can contribute to the diminiſhing the conſumption of foreign wine, or what is ſold for ſuch.

Among the various articles of foreign luxury, wine certainly makes one of the moſt capital; and yet, what with the taking ſuch extreme great quantities, as oblige us to receive, as well the product of inferior, as good vintages; and what with adulteration, as well practiſed before the wine is imported hither, as after; we in general drink very indifferent natural wines, or very exceptionable arti-

ficial mixtures of liquors, called ſo. Though for theſe, we either pay great annual ſums to foreign countries, or to thoſe, who make it their buſineſs to impoſe upon us at home.

This is the more to be regretted: becauſe we have it in our power wholly to avoid it: and, by a little attention and trouble to provide ourſelves with wine, that is ſuperior in flavour, cordial effect, wholeſomeneſs, and every other quality, with a ſaving of at leaſt fifty or ſixty *per cent.* of the expence. The means, by which, I ſuggeſt it to be in our power to do this, is, by the domeſtic production of wine in our own families: which, were the art well known, and the advantages, as I have here enumerated them, well underſtood, could not ſurely fail to be a much more general practice than it is at preſent.

It may be ſaid to appear from experience, that wine thus made here, is not ſo good as the foreign: and that, we find, in the inſtances of thoſe, who have tried to introduce it, the ſucceſs is not equal to my repreſentation. To this, I anſwer, that experience has verified what I advance, in the few inſtances of thoſe, who have made domeſtic wine with ſkill; and kept it to be of a due age: without which, even foreign wine would not be good. But the reaſons, why greater numbers do not ſucceed, is the want of knowledge; a ſordidneſs, with reſpect to expence; or the drinking the wine before it be fit: which is almoſt univerſally the caſe. For, where this art has been practiſed without any of theſe diſadvantages, ſuch wine has been produced, as not only has equalled the foreign, in all general good qualities; but has even been miſtaken for ſeveral of the moſt valuable kinds, even by the moſt ſkilful judges.

The want of knowledge in the art of making domeſtic wine, being, therefore, one principal cauſe of the neglect of doing it more frequently, I ſhall here endeavour to remove it, by furniſhing ſuch inſtructions, as can ſcarcely fail to enable any attentive perſon to practiſe it, with eaſe and certainty. And, I am perſuaded, that, to middling people, eſpecially thoſe living in villages and places remote from ſea-ports,

where it is difficult to procure even indifferent wine in ſmall quantities, I ſhall do a material kindneſs: though the advantage of making domeſtic wines is, by no means, confined to ſuch perſons, or ſituations; but even all others might find their account in it, both with reſpect to expence and health.

I will, therefore, firſt give a recipe for making the moſt perfect wine, that can be produced, by compoſition, in this country. By compoſition, I mean, ſuch as is not made of the ſimple native juice, of any one kind of fruit. But this kind is, indeed, in a great degree native, as the water added to the dry fruit is only, in fact, the reſtoration of what evaporated in the drying and ripening the fruit: and the produce of this proceſs is, therefore, in reality, a natural wine, and ſuperior to any, that can be made of the native juices of the fruits of our country; or perhaps equal to the beſt of thoſe of any other. This recipe will ſerve, alſo, as a baſis, for the ſhowing afterwards how other, and cheaper kinds, may be made.

Take thirty gallons of ſoft water, either rain, or river water. It ſhould be obtained in as clear a ſtate as poſſible, but boiling is needleſs. Put this water into a veſſel, at leaſt, one-third bigger than will contain that quantity: and then add to it one hundred weight of Malaga raiſins, groſsly pickt from their ſtalks. Mix the whole well together, that the raiſins may not remain clotted in lumps: and then cover it partly, but not intirely, with a linen cloth; and let it ſtand in a warm place, if the ſeaſon be not hot. It will ſoon begin to ferment; and muſt be well ſtirred about, twice in twenty-four hours, for twelve or fourteen days. It muſt be then examined, by the taſte, to try if the ſweetneſs be nearly gone off: and if that be found ſo, and the fermentation be greatly abated, which will be perceived by the raiſins beginning to lie quietly at the bottom, the fluid muſt be ſtrained off; and preſſed out of the raiſins, firſt by the hand, and afterwards by a preſs, if ſuch be eaſily procured. But, if there be no preſs, two boards may be uſed with the aſſiſtance of a large weight, or

other ſtrong compreſſive force; which muſt be continued as long as any fluid can be made to drop from the maſs. The fluid, thus ſeparated from the ſkins, or marc of the raiſins, muſt be then put in a good ſound wine caſk, well dried and warmed, together with eight pounds of Liſbon ſugar, and a little yeaſt: but ſome part of the liquor muſt be kept out, to be added, from time to time, as the abatement of the fermentation, that will come on again, may admit, without the wine riſing out of the caſk. In this ſtate it muſt continue for a month, with the bung-hole open: and then, the whole of the liquor kept out, having been now put in the veſſel, muſt be cloſely ſtopped up; ſo that no air may enter: and in this ſtate it muſt be kept for a year, or longer. At which time, it may be bottled off.

This wine may be drunk, and will be very good at the end of a year and half: but it will be much better, if kept longer: and will improve for four or five years. When it has a proper age, it will equal any of the ſtrong cordial foreign wines: and may, by the addition of proper ſubſtances to flavour and colour it, be made to reſemble them.

This is the moſt perfect kind, of what may be called artificial wine; but others may be made cheaper. There are two methods of making a ſaving in the expence. The one is, to ſubſtitute, inſtead of the whole quantity of raiſins here directed, a greater proportion of ſugar: leaving out four pounds of raiſins for one of ſugar added: or the quantity of both ſugar, and raiſins, may be diminiſhed; and a proportion of clean malt-ſpirits added, when the bung of the caſk is cloſed up. The uſe of diſtilled ſpirits, in this manner, is not ſo objectionable, as it may at firſt appear to perſons, who are not acquainted with theſe matters. For ſuch ſpirits will loſe their fiery quality, and be rendered ſoft and mellow, by their incorporation with the oily part of the wine. And there is nothing more certain, than that the practice of uſing them is general in the preparation of all the foreign wines, for our market: and moſt particularly thoſe ſtronger kinds, which are moſt eſteemed by us.

Any

Any other kind of large raiſins, which are cheap, may be uſed, as well as the Malaga: and the thinner the ſkins, and the ſweeter the pulp, the ſtronger will be the wine.

It has been practiſed formerly to bruiſe the raiſins; but it is unneceſſary with reſpect to the common ſorts, as they will ſoon burſt with the fermentation; and freely give out their contents. But there are ſome ſmall kinds with tough ſkins, which, if employed for this purpoſe, ſhould be bruiſed: or they will reſiſt the penetration of the water. Theſe kinds are not, however, ſo good for the purpoſe of making wine as the larger; or, at leaſt, if they be choſen for any particular flavour, they may give the wine, there ſhould be only a certain proportion mixt, added to ſome of the other kinds: and, in this caſe, they ſhould be firſt bruiſed.

The practice of a double fermentation, as here directed, firſt of the raiſins themſelves, and afterwards of the ſugar, is not the common method: and very good wine may be made, by fermenting both at the ſame time. But this method is, nevertheleſs, preferable; for it ſometimes happens, from ſome unknown circumſtances in the fermentation, when ſuch method is not practiſed, that the wine will turn out cloudy, and not admit of being fined, by any means at preſent underſtood: which accident is prevented by this double fermentation remaining, as the ſecond perfectly works all the remaining half fermented parts of the pulp. Moreover, in conſequence of this more perfect fermentation, the wine is lighter, and becomes wholeſome and perfect with leſs age: the glutinous matter of the raiſins being intirely reſolved.

Of this wine, by adding the proper flavour, may be formed, imitations of all the natural wines, of a very ſtrong body: and, by abating the proportion of raiſins, ſugar, or both, other ſmaller kinds, may, by the ſame means, be produced.

If this wine be perfectly fermented, and kept a long time, ſo that no ſweetneſs remain, it will reſemble Madeira: and has very frequently paſſed for it.

An

An imitation of Frontiniac, may be made, by the wine, in which the proportion of ſugar, or of malt-ſpirits, to the raiſins, is large; and the whole body weaker. The muſcadel flavour of Frontiniac, being exactly to be imitated, by an infuſion of the flowers of meadow ſweet, in ſome of the wine: and added in that proportion, which may be found ſufficient to raiſe the due degree of the flavour. In the making this artificial Frontiniac, the fermentation ſhould be ſtopt, by cloſing the caſk, and adding the ſpirit, while a conſiderable ſweetneſs yet remains: and the wine may be drunk after it has been a ſhort time in bottles.

Cyprus wine may be imitated, alſo, by the ſame means: the infuſion of the meadow-ſweet being added to the wine prepared in the beſt manner above directed. But, in this caſe, three or four pounds more of ſugar, than the quantity given in the recipe, ſhould be uſed; and the fermentation ſtopt, while a conſiderable degree of ſweetneſs remains. This kind will be the better for age: and, if properly managed, can never be diſtinguiſhed, even by actual compariſon, from the true Cyprus: as I can aſſert from the fact itſelf.

The imitation of mountain is to be made, by preſerving a ſmall degree of ſweetneſs, giving the nut-like flavour, and keeping the beſt kind of the above wine to a due age. This nut-like flavour may be obtained, by the infuſion of the Florentine orris-root, powdered with a very ſmall proportion of orange and lemon-peel: and the wine may be rendered more dry or ſweet, by continuing the fermentation a greater or leſs time; and adding a correſpondent proportion of clean malt-ſpirits, when the fermentation is ſtopt ſooner. The adding ſome of the ſtony ſeeds of the raiſins well bruiſed, alſo, gives the nut-like flavour: and the putting in a part of the ſtalks of the raiſins, gives a ſharpneſs, found in general in this kind of wine.

The racy taſte of canary, now commonly called ſack, may be counterfeited by the addition of a proper quantity of the juice of white currant-berries to the wine, made with a large proportion of ſugar to the raiſins; and left

very

very ſweet in the fermentation. But it is ſaid, that a ſpirit, diſtilled from the leaves of clary and clean malt-ſpirits, and put to the wine, will give to it ſuch a ſtrong reſemblance of ſack, as renders it abſolutely undiſtinguiſhable from that wine.

It is ſaid, alſo, that the juice of the bramble-berries, added to the mixture of the wine, before the fermentation, gives both the exact colour, and flavour of claret. But, in this caſe, the quantity of raiſins ſhould be conſiderably diminiſhed, and that of the ſugar increaſed, though not to the full proportion: as the fermentation muſt be continued till all ſweetneſs be deſtroyed; and this wine is not intended to have ſo great a body as the others.

It is better, therefore, for this imitation of claret, to work it only of moderate ſtrength; and to add ſome proportion of diſtilled ſpirit: it will be perfect at the end of two years. This, and the imitation of ſack by the ſpirit of clary, I have never ſeen tried: but have them on very good authority. I ſhould be apt to believe, a ſmall proportion of red-argol, or tartar, diſſolved in ſome of the wine, and added together with the ſpirit, when the bung is cloſed up, would aſſiſt the imitation very materially.

Any intelligent perſon may eaſily collect, from theſe inſtructions, ſufficient lights to qualify them to make better or cheaper kinds of wine, according to their inclination. But whatever kind is made, at leaſt a year ſhould be given to it: and, in moſt caſes, a longer time. For nothing has ſo much contributed to the diſcrediting, and excluding the uſe of domeſtic wines, as the drinking them too new: eſpecially after an injudicious, and undue management of the fermentation; by which means they have been made to appear flatulent, aceſcent, and foul. But the very oppoſite of theſe qualities will be found in them, when properly treated and kept.

I ſhall now proceed to give ſome directions for making a kind of ſmall beer; which, from cheapneſs, agreeableneſs, and perhaps wholeſomeneſs, is greatly preferable, to that which is made by brewing malt: and which has this

further

further advantage, that it may be made ready for drinking in three or four days time. The reaſon for troubling you with it, gentlemen, in the *Muſeum Ruſticum*, may not immediately appear to all. Some may deem it a trivial concern; and others may, with truth, ſay, it is a matter already known to many. As to the firſt objection, I ſhall anſwer, that I believe it may be made very uſeful to many in particular ſituations. Where there is occaſionally a neceſſity to employ a number of hands, at particular times; eſpecially in hot ſeaſons, as in the caſe of harveſt, hop gathering, *&c.* a cheap and very wholeſome refreſhment may be ſupplied: and the maſter, whether farmer, or other perſon, will find his advantage, in the choice of hands, the incitement of ſuch a refreſhment will produce. The ſame will hold good with reſpect to ſeveral manufactures, where numbers of hands are employed. As to the ſecond objection, that the way of making this kind of beer is already known, the fact muſt be admitted to be partially true. It is in great uſe at ſea, and with peculiar good conſequences, both with relation to its refreſhing and ſalutary effects. For nothing is more preventive of the ſcurvy, or more agreeably regaling to ſailors, than ſpruce-beer. It is, alſo, known, and uſed by the common people on ſhore, in ſome particular places. But this is far from being the caſe in general: as there are many places where no ſuch thing is practiſed, or underſtood; though only the ſmalleſt wages are there allowed for hard labour; and, conſequently, the greateſt occaſion ariſes for a ſubſtitue to common ſmall beer, which the poor people can neither make, nor purchaſe. In many of theſe inſtances, the means of procuring ſuch a liquor, would be a great relief to them: and to thoſe concerned with numbers of people in ſuch ſituations, whether colliers, miners, manufacturers, farmers, *&c.* I recommend, and here give the requiſite information for making this beer. The kind, I mean, is that commonly called ſpruce beer: but the uſe of the ſpruce, though good, where it can be eaſily obtained, is not eſſential to this liquor. It is, in fact, only the ſolution of melaſſes, fermented to a vinous ſtate:

ſtate: and the particular manner of beſt performing the matter is this.

Take of water, fifteen gallons; and boil one half of it, or as much as can conveniently be managed in ſuch pot, or copper, as is at hand. Put the part of the water thus boiled, while it is yet of its full heat, to the cold part, contained in a barrel or caſk: and then add one gallon of melaſſes, commonly called treacle, ſtirring them well together. Add a little yeaſt, if the veſſel be new: but, if it have been uſed for the ſame purpoſe before, the yeaſt is unneceſſary. Keep the bung-hole open, till the fermentation appear to be abated; and then cloſe it up. The beer will, in a day or two afterwards, be fit to drink.

It is uſual to put tops of the ſpruce-fir into the water, which is boiled for making this beer: and it is then called *ſpruce beer*. But though this is done at ſea, when ſuch tops can be obtained, on account of the ſcurvy: yet it is not neceſſary; and may very well be omitted where they are not to be eaſily procured. Scurvy-graſs, or other herbs or drugs, uſed in making purl, gill-ale, or any other flavoured malt liquor, may be added at diſcretion. But a little of the outer rind of an orange-peel, infuſed in the beer itſelf, and taken out as ſoon as it has imparted a ſufficient degree of bitterneſs, will both be found grateful, and aſſiſt in keeping the beer from turning ſour. A very little gentian root, boiled in the water, either with a little orange-peel, or without, gives alſo a very cheap, wholeſome, and pleaſant bitter to this beer; and will likewiſe help to prevent its turning ſour.

I ſhall now add a few words, on the other ſubject I have mentioned above; which is, the method of imitating the rum brought from the Weſt-Indian Iſlands; or rather of making the ſame elſewhere from melaſſes. The reaſon of this conſideration is founded, on a well-known fact, *viz.* that from melaſſes, or the ſame ingredients as are made uſe of in the iſlands where the beſt rum is made, when they are diſtilled here, a ſpirit ſo different is obtained, that it is not even pretended to be rum at all, but bears the deno-

mination of melaſſes ſpirits: and, in the northern colonies of America, alſo, only a very inferior kind of rum is produced from the ſame ingredients. Now it is certainly a ſpeculation of ſome utility, as well as curioſity, to determine to what this difference is owing: and to know, if it can be done, how to produce rum here, inſtead of the common melaſſes ſpirits, from the melaſſes; and, in North America, to make ſuch as is equal to that diſtilled in the iſlands.

The cauſe why melaſſes affords rum in the iſlands, and a ſpirit of a different kind here, or of the ſame kind, but not equally good, in North America, has been aſcribed to three principles.

The firſt is, *that the fermentation renders the ſpirit different, in this manner, from the effect of the difference of climate.* The ſecond is, *that the melaſſes being uſed there while new, are then in a better ſtate for this purpoſe.* The third is, *that the diſtilling the rum in large veſſels, and ſuffering part of the melaſſes and feculencies to adhere to the ſtill, as is practiſed in the iſlands, occaſions a part of the melaſſes to be burnt, and conſequently to produce a conſiderable quantity of empyreumatic oil of a peculiar kind, which, riſing with the vinous ſpirit, mixes with it, and gives it the particular flavour and oily nature of rum.*

As to the firſt reaſon, or the difference of fermentation in the Weſt-Indies, and here, it might account for ſome variation in the produce: but certainly not ſuch as is really found in the caſe of rum and melaſſes ſpirit. The great diſſimilitude betwixt them lies, in the firſt, wholly wanting that *acido-dulcid* taſte, and oily conſiſtence, that is found in the other; and which is obviouſly owing to part of the melaſſes being burnt; and affording an empyreumatic oil, that cannot be the product of any mode of fermentation: but muſt be the effect only of a conſiderable degree of heat, either during or before the diſtillation.

The ſame may be alledged, as to the ſecond aſſigned reaſon of this difference, or the newneſs and freſhneſs of the melaſſes. For all that would reſult, from thence, would be, that the new would be leſs aceſcent than the older: which could

could only make a ſmall variation in the ſpirit produced, and that of a very different nature from what is really perceived betwixt our melaſſes ſpirit and rum. For it is well known, by thoſe who practiſe imitations of brandy and rum, that acids dulcify the ſpirit, and render it leſs fiery, and more gentle: and in the counterfeit rum, a conſiderable quantity of oil of vitriol is, therefore, uſed to deſtroy the taſte of *empyreuma*, or faints, as it is called, of the malt ſpirit, and gives it a ſoftneſs. So that inſtead of rendering the ſpirit more unlike rum, the keeping the melaſſes, till they tend towards an acid ſtate, would rather promote the reſemblance. The peculiar oily conſiſtence, and flavour of rum, can certainly never be the conſequence of uſing the melaſſes in a freſher or ſtaler ſtate. For, if it had been ſo, the fact would ſoon have ſhewn itſelf, by the difference of the melaſſes ſpirit diſtilled here; which muſt, of courſe, in ſome caſes, have approached nearly to, or actually have been, good rum: as it may be ſuppoſed, the melaſſes muſt ſometimes have been uſed as newly here, as in the Weſt-India iſlands: and this would neceſſarily have led to their being always uſed ſo, if ſuch an advantageous conſequence had been once known to have attended it.

The laſt reaſon, therefore, or the burning of the melaſſes in the ſtill, if any of the three be, muſt prove the true one. It was firſt broached, in part, by Mr. Smith, in a pamphlet, as a ſupplement to his work on the *Art of Diſtillery*. He there aſſerts, as a fact, that it was the general cuſtom for the negroes to omit the perfectly cleanſing the ſtills, which are very large: and that a great quantity of the feculence and melaſſes adhered, conſequently, to the bottom of them, and was continually burnt: and to the empyreumatic oil of the ſugar, contained in the melaſſes, and thus burnt, he attributed the peculiar flavour and oilineſs of the rum. Admitting this fact, there can be no doubt, but that the difference of rum, from other ſpirits diſtilled from fermented ſugar or melaſſes, muſt conſiſt in this circumſtance: and indeed it is evident, from the very

flavour and oily nature of the rum itſelf, that the addition of an empyreumatic oil of this kind, really conſtitutes this difference.

If this be allowed, as there is the greateſt reaſon it ſhould, a method naturally preſents itſelf, of bringing any ſpirit, diſtilled, either in Europe or North America, from ſugar or melaſſes, to a very cloſe reſemblance, or rather perhaps ſameneſs of nature, with the rum produced in the Weſt-India iſlands.

This method is the burning a proper quantity of ſugar or melaſſes in the due degree; and adding it to the fermented liquor of melaſſes before the diſtillation: by which means it is, on this ſuppoſition, preſumed, that what is wanting, to render the ſpirit diſtilled from ſuch liquor the ſame with rum, muſt be of courſe ſupplied.

The degree of burning, and the proportion of the burnt matter to be added to the fermented liquor, for this purpoſe, muſt depend on experiment: but a few trials would aſcertain it. And, if the difference of rum, from melaſſes ſpirits, does really reſide in this circumſtance; which there is great room to think, as well from juſt obſervation on the nature of the ſubject, as from Mr. Smith's authority for the fact; the practice of this method might be rendered of commercial utility. The particular advantages of this would here be, by converting what is now melaſſes ſpirit into rum, and greatly increaſing its marketable value: and, in North America, by enabling diſtillers of rum there to bring theirs to a much greater reſemblance to that of the iſlands; and conſequently to make a much more advantageous return of the melaſſes, they purchaſe by the barter of their own produce: a circumſtance, at preſent, of great conſequence, both to the peace and lucrative intereſt of thoſe colonies.

The rendering rum, by this means, cheaper, would, alſo, tend to the excluſion of thoſe wretched counterfeit kinds, made of malt ſpirits, dulcified with a large proportion of acid, particularly oil of vitriol; which are very injurious to particular conſtitutions. Extreme great quantities of ſuch

ſuch counterfeit kinds are now vended: and ſo much induſtry has been exerciſed in the art of making them, that the preparing mixtures, for producing the reſemblances of the various genuine ſpirits, is now become a ſeparate trade: and the profeſſors of it are called *Flavour makers*. All ſuch practices ought either to be under due regulations, or be wholly prohibited: for, being in the hands of perſons, ignorant of the ſalutary or injurious effects of the mixtures they make, ingredients very detrimental may be introduced; and diſpenſed, by this means, amongſt a great number of the common people, who never conſult any thing but their palate, in matters of this nature.

I am afraid, gentlemen, I have been more prolix than the room you may chuſe to allow to matters of this kind will admit of: in which caſe, I leave you at liberty to inſert this letter, at your own time; or wholly to omit it. But if you are indulgent enough to think it worthy a place, I will endeavour, on future occaſions, to furniſh you with further matter towards the producing that variety, which ſome of your correſpondents have called for; and which, indeed, you yourſelves have lately promiſed.

I am, GENTLEMEN,

Your very conſtant reader,

Well-wiſher, and humble ſervant,

COMMERCIALIS.

NUMBER XXVIII.

Deſcriptions of thoſe of the Weeds, enumerated in Vol. V. page 301, *that are annual, and not univerſally known. In a ſecond Letter from* P. B. C. *on that Subject.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN compliance with a deſire, expreſſed in a note upon my former paper, ſeconded by *Ruricola Gloceſtris*, Vol. VI. page 7, I have ſent you a ſhort, and, I hope, plain deſcriptions of the principal *annual weeds*, which I before enumerated. If what I have now done, ſhould prove acceptable, this ſhall ſoon be followed by an account of the biennial, and perennial weeds. You will perceive, that I have not deſcribed all which were enumerated. The reaſon is, that ſome of them, as the Chickweed, Cockle, Poppy, Shepherd's-purſe, Sow-thiſtle, Groundſel, Blue-bottles, *&c.* are too well known to need a deſcription: others, though it was not amiſs to name them, are yet too inconſiderable to attract much notice.

When theſe deſcriptions are made, we ſhall want only the local names *, and the methods of extirpation, to compleat

* As the local names of weeds, in each country, can be only known by thoſe, who reſide there; and muſt, therefore, be collected by diſtinct perſons, we ſhall be extremely obliged to any gentleman, who will furniſh us with the liſt of ſuch as come under their reſpective obſervation. This may be done by thoſe, to whom, neither the botanical name, nor any other than that common in their neighbourhood, is known. For the plant being eaſily diſtinguiſhed by the deſcription, aided by the figure in the plates, there is nothing more required than to join the local name to that prefixed to the deſcription: and thus to make the liſt. From ſeveral ſuch liſts, ſent from different places, we ſhall have the proper matter for forming one; which, by a proper digeſt, will make a catalogue, that will enable every

ANNUAL WEEDS

Engraved for the Museum Rusticum &c

Annual Darnel-Grass.

Fig. 1.

Bearded Oat-Grass.

Fig. 2.

Bastard Alkanet.

Fig. 3.

The Dodder.

Fig. 4.

Small Corn Parsley.

Fig. 5.

Lesser Hemlock.

Fig. 6.

Shepherd's Needle.

Fig. 7.

Knott Grass.

Fig. 8.

Black Bindweed.

Fig. 9.

Corn Crowfoot.

Fig. 10.

Charlock.

Fig. 11.

Yellow Vetchling.

Fig. 12.

Corn Marygold.

Fig. 13.

Yellow Rattle.

Fig. 14.

Red Eyebright.

Fig. 15.

compleat this ſubject. If the deſcriptions be not ſatisfactory, the names will refer the reader to Mr. *Hudſon*, who always quotes *Gerard's Herbal*, where a tolerable * figure of the plant may uſually be found. The diviſion of the weeds into *annual*, and *perennial*, and the addition of the time of flowering, are circumſtances, which give ſome little aſſiſtance, at leaſt, in their extirpation.

I am, gentlemen, with the greateſt readineſs, to contribute towards the improvement of huſbandry, through the channel of the *Muſeum Ruſticum*,

Your obedient humble ſervant,

P. B. C.

every reader to underſtand what is meant by any name not uſed in his own neighbourhood. For want of this, obſcurity frequently ariſes in communications from ſome of our correſpondents, who write with great intelligence in other reſpects.

If any gentleman, who ſhall favour us with their correſpondence, on account of the local names of weeds, will alſo impart to us any peculiar methods of extirpating them, which may have occurred to their obſervation, they will very materially contribute to the deſign of an eſſay towards an œconomical hiſtory of weeds. E. T. H.

* In order to render this attempt towards *an œconomical hiſtory of weeds*, more generally uſeful, and ſatisfactory, to our readers, many of whom unqueſtionably have not Gerard's Herbal here referred to: and, in order, alſo, to ſhow the value we ſet on our ingenious correſpondent's communication, by doing every thing in our power, to make it duly effectual; we have annexed a plate of the figures of the weeds here enumerated; taken either from Gerard's, Parkinſon's, or ſuch other Herbals, as ſupplied them in the moſt perfect manner: and we will do the ſame, with regard to the biennial and perennial weeds, whenever he favours us with the promiſed deſcriptions of them. In the mean time, we here acknowledge our obligations to him for this favour, in ſo readily complying with an intimated requeſt, which we did not think ourſelves entitled to urge in a more explicit way. R. E. A. T. H.

Deſcription

Deſcription of Annual Weeds, &c.

ANNUAL *Darnel-graſs* (ſee fig. 1. plate 1.) is called *White Darnel* by Gerard *, and in the Southern counties *Crap*; though, in Worceſterſhire, they call the Buckwheat by this name †. It was a ridiculous old notion, that this weed, which has ever been ſtigmatized, as one of the greateſt peſts of corn, is produced from bad ſeed of wheat. The French call it *Yvraie*; becauſe, put into bread, or beer, it is ſuppoſed to cauſe drunkenneſs. It has always been reckoned bad for the eyes; and to occaſion vertigoes. This plant is very like the Red Darnel-graſs, which has been ſo much cultivated, under the name of *Ray-graſs* ‡, or *vulgarly Rie-graſs*: but the ſpike is much larger and paler; and has beards, which the Ray-graſs is entirely without. It is likewiſe annual: whereas the Ray-graſs has an abiding root. Its ſeeds ripen with the corn.

Bearded Oat-graſs, or *wild Oats*, (ſee fig. 2. plate 1.) is very like the common Oat in appearance, but generally over-tops it. The ſeeds are alſo of a duſky reddiſh colour. and hairy towards the bottom. The beards or awns are very long, ſtiff, and bent. As it ripens with the corn, or but little before it, the extirpation of it is not very eaſy.

Baſtard Alkanet (ſee fig. 3. plate 1.) is called, alſo, *Baſtard Gromill* or *Gromwell*, and *Salfern*. Nothing is more common among the corn, eſpecially among rie, than this weed. It may eaſily be known, by its red roots; which yield a red tincture, and are uſed by the country girls in Sweden, to ſmear their faces with. From the root, uſually riſes a ſingle ſtem, about a foot high, rough, and branching out at the top. The flowers are ſmall and white, ſurrounded with five long, narrow, hairy leaves ‖, and ſucceeded by four white rough ſeeds.

* Page 78.

† Ray's Engliſh names.

‡ I ſhould ſuppoſe, from the French *Yvraie*, it is certainly nothing like Rie.

‖ Called by botaniſts, the empalement or flower-cup.

The

The *Dodder*, (ſee fig. 4. plate 1.) is ſo remarkable a plant, that it cannot be miſtaken by thoſe who know the name. It is entirely without leaves: and does not depend on the ground for nouriſhment; but when it is grown up, rots at the bottom; and lives upon the juices of other plants, about which it entwines itſelf, by means of ſmall threads of a red colour, which it throws out. The flowers are ſmall, and come out in roundiſh heads, or bunches, many of them together, here and there, from the ſtem.

Small corn Parſley, (ſee fig. 5. plate 1.) though it is very common among corn, does not ſeem to be much known. It is a low branching plant. The branches grow thick together, and are knotted and crooked. The flowers grow cloſe together after the manner of parſley, *&c.*; * and are of a white colour inclining to yellow. The ſeeds are large in proportion to the plant; and are ſet about with little crooked briſtles; which make them adhere to the ſtockings in great plenty, when the ſeeds are ripe; which is about, or a little after harveſt.

The leſſer Hemlock, (ſee fig. 6. plate 1.) called by Gerard, *Thin-leafed wild Hemlock*, is ſo well known under the name of *Fools parſley*, as ſcarce to need a deſcription. However, as it is a matter of conſequence to diſtinguiſh poiſonous plants from thoſe which they reſemble, we may obſerve, that though the leaves reſemble parſley, yet they are much darker on their upper ſurface, but pale and ſhining underneath. The diviſions of the leaves are much ſharper; and they have no ſmell, nor ſcarcely any taſte. When the plant is in flower, it is eaſily known, by the three long narrow green leaves, which hang down from the little ſtems, that immediately ſupport the flowers †.

Shepherd's Needle, or *Venus's Comb*, (ſee fig. 7. plate 1.) has its names from the remarkable ſhape of the ſeeds with their appendage, reſembling in this reſpect the *Cranes bills*: theſe would be alone ſufficient, to diſtinguiſh the plant.

* As all the plants do, which botaniſts ſtile umbelliferous.

† The *Involucrum* at the baſe of the partial umbel.

They ſucceed ſmall white flowers; and come out in a bunch, like needles, or the teeth of a comb, ſet cloſe together. The leaves are very finely cut.

Knot-graſs, (ſee fig. 8. plate 1.) is ſo called from its knots or joints, of which its ſlender creeping branches are full. After harveſt, the lands, in many places, ſeem all coloured with the little red flowers of this plant.—It is called, alſo, *Swine's graſs*: and, in the North, *Bird's Tongue*.

Black Bindweed (ſee fig. 9. plate 1.) has a ſtem, that lays hold on any neighbouring plants, and twines about them from right to left. Its leaves are ſmooth, and ſhaped pretty much like thoſe of the buck-wheat; which its ſeeds alſo reſemble; being triangular, but ſmaller. It frequently ramps up in hedges, and gardens; and is alſo very common among corn.

Corn-crowfoot (ſee fig. 10. plate 1.) has an upright ſtalk. The leaves are of a pale green; and cut into long, narrow, acute ſegments. The flowers are much ſmaller, and paler than in the crowfoots of the paſtures: but the ſeed-veſſels are the moſt remarkable; for they are covered all over with prickles. This is extremely common among corn.

Charlock, (ſee fig. 11. plate 1.) called, alſo, *Chadlock*, *Catlock*, *Carlock*, and *Wild Rape*, is, I ſuppoſe, too generally known to need a deſcription.—The *white* and the *yellow-flowered Charlock*, or *wild Radiſh*, which are only varieties of each other, and not ſo common as the former, may eaſily be diſtinguiſhed from it, by the paleneſs of their flowers; and the form of their ſeed-veſſel; which is round, ſmooth, and jointed. Almoſt the whole plant is covered with bent pellucid hairs.

Yellow Vetchling, or *ſmall yellow Fetch*, (ſee fig. 12. plate 1.) has long, ſlender, divided ſtalks. The leaves are triangular, and grow by pairs cloſe to the ſtalk. Out of theſe leaves, comes a tendril, by which the plant ſupports itſelf; and, on a long ſtalk, one ſmall pea flower, of a yellow colour, which is ſucceeded by a flat pod, about an inch in length; containing ſix or ſeven roundiſh ſeeds.

Corn-marigold, or *Golden Corn-flower*, (ſee fig. 13. plate 1.) is, the *Buddle* or *yellow Buddle* of the Kentiſhman * (Vol. V. 2. and 371.) Its leaves grow cloſe to the ſtem, in an alternate order. They are of a blue-green colour; and are cut about the edges. The flowers are like thoſe of the Marigold; large, and of a beautiful yellow.

Yellow Rattle (ſee fig. 14. plate 1.) is known, by its leaves being finely indented about the edges; its flowers being yellow; and its ſeed-veſſel ſwelling into a dry, large compreſſed bladder, divided into two cells, and containing ſeveral compreſſed ſeeds, ſurrounded with a membrane.

Red Eye-bright, or *Eye-bright Cow-wheat*, (ſee fig. 15. plate 1.) has a ſtem riſing not more than a foot high; long narrow leaves, indented about the edges; and purple flowers growing in ſpikes. It flowers in July, and Auguſt.

NUMBER XXIX.

An Account of a newly-diſcovered Method of deſtroying Inſects, that devour the Leaves and injure the young Shoots of Fruit Trees, by medicating the Trees with Quickſilver; communicated to the Society for promoting Arts, &c. With Obſervations on the ſame, in a Letter from Agricola *to the Editors.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN further purſuance of my promiſe, of communicating to you obſervations on any matters of importance, which ſhould come under conſideration in *the Society for promoting arts, &c.*; and, in order to aid their intention of having as many experiments as poſſible made on this ſub-

* His *Blue Buddle* is I ſuppoſe *Blue Bottles*, ſo common among corn.—What the *Walder* is, I cannot imagine. He explains it, by its being like *Kilk*, which is to me *ignotum per ignotius*.

ject; I here ſend you an account of a ſuppoſed *diſcovery*, reſpecting the means *of deſtroying inſects on trees*, communicated to them: and which, if, on further trials, it prove true, muſt of courſe be deemed as curious as to the manner, as important as to the conſequences. Curious as to the manner, becauſe it cannot be accounted for by any of the laws and properties aſcribed to vegetables, by thoſe, who have proceeded on the ground of induction, the only ſafe foundation on which we can form principles in phyſics: and important as to the conſequences, becauſe it would not only afford an eaſy and effectual remedy for the great miſchief done, by inſects and caterpillars, to the product of fruit; for which end it is now propoſed: but becauſe it will alſo neceſſarily lead to many applications of the ſame means, to other intentions, not leſs beneficial: and, moreover, give a light into the vegetable œconomy, that can ſcarcely fail of producing the moſt momentous effects.

The facts contained in this account, may appear to perſons, not acquainted with chemiſtry, and the phyſiology of vegetables, very probable: as being of a ſimple nature; and not attended with any difficulty to the conception: but to the more intelligent in thoſe branches of ſcience, they muſt ſeem very extraordinary; when the nature of the ſubject and manner of operation are well conſidered. And, indeed, if the account itſelf did not come vouched by a very reſpectable authority, a conſiderable ſhare of credibility, would be requiſite for any degree of belief in it. Not to dwell too long, however, on the diſquiſition of a matter, the particulars of which, are not yet diſplayed, I will now proceed to ſtate, what was laid before the Society; and the manner in which it was done.

The narrative of this diſcovery, was contained in a letter, written by Dr. R—— to Dr. P——, and dated March 11, 1765; in which the former begs the aſſiſtance of the latter, "in laying, before the learned world, an account "of ſome experiments, that have been tried with ſucceſs: "and which, when fully known, will, he believes, be of

"very

" very great ſervice to the vegetable part of the creation, " by totally deſtroying thoſe pernicious inſects, that are " apt to infect the tender leaves and young ſhoots of our " choice fruit-trees: and for which, no remedy, that he " had ever heard, or read of, has been as yet propoſed, " that is either adequate to the diſeaſe, or effectual to the " cure." Dr. R——, therefore, in the following part of the letter, deſires Dr. P—— " to lay, before the Society " for the encouragement of arts, &c. the following expe- " riment, that was tried laſt ſpring, with ſucceſs, by one " George Bradford, a clothier in the city of Hereford, " and a very ingenious young man: in order, after the " experiment has been fully tried, they may reward him " in proportion as he may ſeem intitled to it." But Dr. R—— adds, that "whether he may be thought worthy of " any recompence, or not, he very chearfully ſubmits it " to the trial of the curious; and hopes, they may reap " the ſame advantages, he did laſt year, by clearing their " trees of theſe pernicious inſects." The Doctor then proceeds as follows, to give the relation of Mr. Bradford's invention and ſucceſs. " The firſt tree he tried the expe- " riment upon, was a favourite plum-tree: I think, a " green gage. He was afraid of trying it on the whole " body of the tree at firſt: as he did not know, but that " it might kill it at once: and therefore he ſelected out a " particular branch, that was deſigned to be cut quite " away, at the winter pruning, for the ſubject of his firſt " eſſay. The method of the experiment is this: He took " a ſmall awl; and pierced, ſloping, through the rind, " and into part of the wood of the branch, but not to the " heart or pith of it; and poured in a ſmall drop or two " of quickſilver; and ſtopt it up with a ſmall wooden plug " made to fit the orifice: and the reſult of this experiment " was, that the inſects all dropt off, from that very branch, " the next day; and, in a day or two more, from off the " other branches of the tree, without any other puncture: " and the tree continued in full vigour; and throve well " all the ſummer after. Encouraged by this ſucceſs of

" the

" the firſt eſſay, he next tried it upon a honey-ſuckle; the " leaves of which were quite covered with them: and " here he ſcraped away the top of the ground with a " trowel; and run his awl, in the ſame ſloping manner, " into the main ſtem juſt above the roots; but, with the " ſame caution as above, not quite to the inner pith; and " the ſucceſs was the ſame as before. The inſects all " dropt off dead the next day after the experiment was " made. The above facts you may ſafely depend upon: " and I ſaw both the trees, on which the experiments " were made, ſince Chriſtmas laſt; and they then ſeemed " to be both very healthy and well. I did not, indeed, " ſee the operation performed: as I was at that time on " my reſidence at L——: but the method, manner, and " ſucceſs, as above related, I had from Mr. Bradford's own " mouth."

This is the account of Mr. Bradford's experiments, as related by Dr. R——, which I thought it moſt fair and proper to give in the Doctor's own words, as in his letter, that your readers may have the matter in the moſt ſimple and ſatisfactory view before them: and, I conceive, that in thus communicating it to you, I am greatly promoting the intention of the Society, as well as that of the Doctor; who ſays, " I think the more univerſally this remedy is " known, and the more it is tried, the greater ſervice it " may prove to be to the ſkilful in botany: and vegeta- " tion, thereby, be greatly improved."

This letter from Dr. R——, as mentioned above, was dated March 11, 1765, though the delivery of it to the Society, was deferred from accident till February laſt. But Dr. P——, in his letter to the preſident, deſiring him to lay the other before the Society, remarks, that experiments have been ſince made, which confirms the firſt obſervations. He ſays, " the advantage, however, hath " ariſen from this delay, that Dr. R—— hath had fuller " proof of the ſucceſs of this diſcovery." The particulars of theſe further trials, in the year 1765, are not related: but we may, from the ſilence in this point, conclude them

them to be the ſame as in the preceding year: otherwiſe Dr. R—— would certainly have given the detail of them.

In this manner was the affair communicated to the Society, through the hands of Dr. R—— and Dr. P——: and it is not leſs extraordinary, as I above intimated, with regard to its probability, than its conſequences. The veracity of theſe gentlemen muſt be, nevertheleſs, unqueſtioned: and if we entertain any doubt of the facts, we can aſcribe the error of the account to nothing, but ſome miſtake in the obſervations on the experiments: an event, that has happened, from a ſingular coincidence of circumſtance, attending particular trials of ſuch matters, to very judicious and accurate inquirers in many ſimilar caſes. It may not be improper, however, to ſtate and explain, more particularly, where the difficulty lies, with reſpect to the readily adopting the notion, that this manner of medicating trees, may be attended with the conſequences here related: as ſuch an inquiry may not only excite a due caution in the obſervations, that ſhall be made in future experiments on this matter; but furniſh ſome lights, which may lead to a more effectual and deciſive performance of them, as well as to the varying them, with deſign to gain further important lights on this very curious ſubject.

In order, therefore, to inveſtigate the matter in this view, it will be proper to examine, how far the appearances, here ſaid to have preſented themſelves, correſpond with known principles relative to the effects of quickſilver; and to the vegetable œconomy, as far as hitherto underſtood. In ſuch a diſquiſition, we ſhall immediately find two very eſſential circumſtances in favour of this relation. The one is, *that quickſilver, diſſolved in any vehicle or menſtruum, capable of diffuſing it properly, deſtroys, when brought in contact with them, almoſt every kind of ſmall animals, whether inſects, or of the vermicular tribe:* and this, though the quantity of ſuch quickſilver in the vehicle be extremely ſmall. The other is, *that quickſilver, in ſome conditions, may be abſorbed by plants; and paſs with their ſap or juices to the extremities of the branches, ſtalks, and leaves,*

leaves, without the leaſt injury to their health or vigour: which holds good even of ſome of the moſt tender and ſucculent kinds.

The poiſonous property of quickſilver, with reſpect to moſt kinds of ſmall animals, is too generally known, to require the leaſt attempt to its proof: and that the moſt minute quantity, when diſſolved in any fluid, capable of diffuſing it, may be ſufficient to this effect, is evinced in the caſe of a preparation uſed by farriers, called the mercurial water. It is made by boiling quickſilver in water: and though it contains ſo little of the quickſilver, that there is no ſenſible diminution of the weight of the quantity put in to be boiled, when the water is afterwards poured off; yet it is well known to deſtroy worms of a very conſiderable magnitude, in the inteſtines of horſes, to which it is given; and affords, therefore, a very clear evidence, as well of the deſtructive qualities of quickſilver, to vermicular animals, as of the very ſmall quantity that is ſufficient to ſuch effect.

That plants are capable of receiving quickſilver, under ſome circumſtances, into their ſap-veſſels, and conveying it throughout every part of their ſtems, and leaves, is demonſtrated by the very extraordinary fact, related in the letter from Governor Thickneſſe to you, inſerted, Vol. I. No. 67, page 278. In this moſt remarkable inſtance, it appeared, that, notwithſtanding the plant was ſo replete with quickſilver abſorbed from the ground, where ſome preparation of mercury had been accidentally thrown, as to perſpire it in a ſurprizing quantity, the plant yet flouriſhed as much, as the others of the ſame kind growing near it. As this fact is atteſted, not only by the gentlemen, to whom Governor Thickneſſe referred, but by ſeveral others of my acquaintance, who ſaw the plant in this ſtate, the truth of it cannot reaſonably be doubted: and conſequently it affords a full proof, that quickſilver, in ſome ſtates, may be taken up, and combined with the ſap of plants, ſo as to be diffuſed through every part.

There is, nevertheleſs, another fact related, reſpecting the finding quickſilver in plants; which, though it does ſtand on ſo good an authority as the preceding, yet demands ſome attention. What I mean, is, an account, to be found in Abbé Lambert's *curious obſervations, on the manners, natural hiſtory, commerce, arts, &c. of the nations of Aſia, Africa, and America*, of the production of quickſilver by vegetables in China. The paſſage, in his work, is this. "There is a method, ſays the Chineſe author, of "drawing mercury from wild purſlane. For this pur- "poſe, you need only take the little leaves of purſlane; "bruiſe them in a mortar with a peſtle of the wood of "Egyptian thorn: and then expoſe them to the riſing "ſun, for about three days; and when they are dry, roaſt "them, ſo as not to deſtroy their nature and virtues. "Put this maſs in a well-varniſhed earthen veſſel, which "you muſt cloſe well, and bury it in the earth forty-nine "days: after which, take out the veſſel; and you will "find quickſilver in perfection.

"Nothing is more certain than this ſecret, and, in the "ſhops in Pekin, they ſell two ſorts of mercury: the one "taken from the mines; which is called *Chan-choueir*; "and the other, obtained from plants: which is called "*Tſao-chonien.*"

The proceſs for procuring the quickſilver here given, ſavours much of the myſtery of alchemy, or may perhaps be related with an omiſſion, or other miſtake, of the ſenſe of the Chineſe writer from whom it is taken. The addition of ſome fluid to the roaſted leaves, ſeems abſolutely neceſſary, in order that any change ſhould be effected; as we know no ferments, or quick revolutions of nature, are produced in bodies while they are in a dry form. But if quickſilver were contained in a plant, in a very divided ſtate, the burying the plant with ſome proper fluid, in order to its putrefaction, might be a proper means of recovering ſuch quickſilver. The fact, however, of there being a kind of quickſilver, commonly ſold in Pekin, of which the very name, in diſtinction to another kind, de-

clares it to be of vegetable production, merits greatly our notice.

If it be true, that quickſilver is thus obtained in China, from plants, they muſt take it up from the ground, abounding with ſome mercurial mineral; moſt probably of the cinnabarine kind: on which ſuppoſition, the fact would agree intirely with that of the above-mentioned inſtance, and receive credibility from it. For, in that caſe, there is great reaſon, according to the gentleman's account, on whoſe garden the accident happened, to believe the preparation, thrown on the earth, that mercuralized the plant, was ſome combination of quickſilver and ſulphur: which is, in reality, cinnabar. Had it not been for that accidental inſtance of the thing itſelf, I ſhould have looked on this paſſage, in the Abbé Lambert's book, as ſcarcely worthy obſervation, from its high improbability, and want of great hiſtorical authenticity: but this concurrent circumſtance, makes the truth of that relation deſerve further inquiry.

With reſpect to the two leading principles, *that quickſilver, diſſolved in a proper menſtruum, and diffuſed in the moſt minute quantity, will kill worms and inſects*; and *that it is capable, in ſome circumſtances, of being received into the ſap-veſſels of plants, and paſſing to every part, without injury to them*; Mr. Bradford's experiment is, in a general view, extremely conſiſtent with known facts. But when we come to conſider the manner of the operation, other principles come in queſtion, that evidently ſuggeſt the greateſt difficulty of aſſent.

In the firſt place, quickſilver, in a crude ſtate, does not combine with the ſap and juices of plants in common: nor indeed with any that experiment has hitherto informed us of: and yet we ſee it was not one ſpecies of trees or ſhrubs only; but different kinds, that alike combined with it here, ſo as to convey it with celerity to the remoteſt part of the plant: and this was performed without heat, or any of thoſe means, that promote the action of bodies reluctant to combine with each other.

In

In the next place, the ſurface of the quickſilver, in contact with the ſap, is exceeding ſmall in this experiment: being only the extremities of the divided veſſels of the wounded part of the plant: and from them it is more natural to expect an emiſſion of the ſap, than an abſorbtion of any fluid; much leſs of quickſilver in its crude and undivided ſtate; in which the particles have a very ſtrong attraction to each other, as is evident from the moſt ſimple trials, with reſpect to the confluence of ſmall globules of it, when they approach each other. So that it puzzles the imagination greatly to conceive, by what mode of operation, the quickſilver is forced or drawn into the ſap-veſſels of the plant, while in this ſtate.

In the laſt place, admitting the ſap would combine readily with the quickſilver, and the veſſels would abſorb the compound, how can it be ſuppoſed, to be conveyed to the remoteſt part of a plant in ſo ſhort a time, as it appears to be, by the facts here related? It will be immediately anſwered by ſome, in conſequence of the circulation of the ſap. But that the ſap does circulate at all, is a mere hypotheſis: and an hypotheſis indeed, exploded by the moſt judicious examiners into the vegetable œconomy, though remaintained by ſome flighty modern French writers. It is, therefore, only eſtabliſhing one difficulty on the ſhoulders of another, and not really removing any obſtacle to a belief of the fact, to aſcribe this ſudden conveyance of the quickſilver to a circulation of the ſap. The aſcent and deſcent of the ſap, to and from the root to the extremities, is agreeable to experiment, and known phyſiological principles: but a circulation, like that of the blood in animals, ſuch as could be ſuppoſed to carry and diffuſe the medicated juice of the part of the plant, where the quickſilver was applied, to every other part, in two or three days, as is here ſaid to be the caſe, is neither conſiſtent with the reſult of other experiments, nor accountable from any thing in the organization, or mechanic ſtructure of vegetables. For they have no heart, or analogous muſcular apparatus, to propel their ſap; no elaſtic arteries to

aid its motion, by their reſilition, nor ſuch ſenſation or irritability, as can urge their vaſcular parts to continual action by repletion, as in the caſe of animals, nothing that can account for a circulation of ſap ſimilar to that of blood.

Moreover, the difficulty, in receiving the notion, that impregnated juices can be conveyed from one part of a plant to the whole ſo rapidly, does not lie in theory only. If we obſerve what happen in other caſes, we ſhall, reſpecting facts, argue ſtrongly againſt it. One ſtriking inſtance is, the manner of communicating the variegation of the jaſmine ſhrub; where the contamination requires a very conſiderable length of time to be ſpread over the whole plant. To render this inference, from the variegation of the jaſmine, intelligible, requires ſome explanation to thoſe who are not verſed in the hiſtory of vegetation. The variegation of the colour of the leaves, or branches of plants, are owing to contaminations of their juices; which happen from accident, or may be effected by art in various manners. In this, of the jaſmine, it is performed by inoculating any branch of a tree of the natural colour, with a bud taken from a variegated one; and afterwards pulling off the bud in a few days. By this operation, the juices of the part of the branch, where the bud was inſerted, are infected by thoſe of the bud: and, after ſome time, the ſuperior part of the branch begins to be blotched, as well the green wood as the leaves, with a ſtrong yellow colour: and this, the year after, appears in other parts of the tree; and, by degrees, ſpreads itſelf over the whole. Here we ſee the progreſs of the impregnated juice, to the diſtant parts, ſlow and gradual, agreeably to the effects of the aſcent and deſcent of the ſap; and conſequently very diſſimilar to that in Mr. Bradford's experiments, which could not be produced by ſuch aſcent or deſcent. If on repetition, therefore, his obſervations ſhould be verified, it muſt, conſequentially, be admitted, that there is a circulation of the ſap; and, indeed, a very quick one: which would be a moſt curious circumſtance

attending

attending this diſcovery. But, in the mean time, in proportion as the organization, and other circumſtances in the known œconomy of plants, ſeem oppugnant to ſuch a circulation, a greater degree of experimental proof, ſeems wanting to eſtabliſh the certainty of the facts, as preſumed according to his account.

I hope, however, it will not be underſtood, that I have ſtated theſe difficulties, in order to diſſuade any from making further experiments on this ſubject, or much leſs, to impeach Mr. Bradford's veracity. It is, on the contrary, to ſhew how curious and intereſting this matter is, as well with regard to ſpeculations of the higheſt moment, as to the immediate practical conſequences; to inſpire the greateſt caution and attention, as well in the operation, as the obſervations on the reſult, and concluſions drawn from it; and to give ſome lights reſpecting the conſequences of further experiments, that may occaſion their being varied and extended, in ſuch a manner as may be moſt effectual in producing the future diſcoveries, which may be expected from eſtabliſhing the principle, that trees may be medicated, ſo as to make quick changes in them, by ſuch a method of application. This is my real intention. For the improbability, ariſing from facts, not ſquaring with received theories or general analogical appearances, is by no means, in my opinion, a ſufficient reaſon againſt examining ſtrictly into them, when they are vouched on good authority: and delivered with ſo great an air of candour. I cannot, for my own part, conceive a ſtronger argument in ſupport of this, than may be drawn from the inſtance of the plant perſpiring quickſilver, as before mentioned; of the truth of which I can have no doubt at preſent; but muſt own it was, in itſelf, as incredible on all accounts, as Mr. Bradford's relation of the event of his experiments. Inſtead, therefore, of diſcouraging the further perſuit of this matter, I would urge the moſt earneſt recommendation, that every trial reſpecting it may be made by thoſe who have proper opportunities: but that ſuch trials ſhould be made with the utmoſt caution. In order

order to which, it would be certainly right to chuſe trees, which are in the neighbourhood of others equally infeſted with the grubs or inſects; and to obſerve cloſely, from time to time, the difference betwixt thoſe on which the operation is performed, and thoſe that are left in their natural ſtate, if any ſhall reſult from the operation.

It would be well, alſo, not only to make the experiment on a variety of trees, but even on the ſtronger herbaceous plants: for though ſuch a practice might not anſwer the trouble, in order to ſave a crop of collyflowers or cabbages; yet, it might avail in more important articles, as particularly ſugar-canes, to which, immenſe damage is ſometimes done by the devaſtation of ſmall animals. If ſuch trials be made on herbaceous plants, they ſhould be on parts of the ſtalks that are hard, and tend to a ligneous texture; or, in default of ſuch, on the uppermoſt part of the root.

If quickſilver be found to act on plants, by this method of application, other bodies miſcible with the ſap, may, likewiſe, by the ſame means, be made to have their proper ſpecific action. This opens a field of inquiry for the effecting ſome other great purpoſes, by this method. I will hint one, that will be very obvious to thoſe, who are acquainted with the modern doctrines, of the phyſiology of plants, though it may not be intelligible to others. We are ignorant what, in the natural and healthful ſtate of a tree, determines a bud to form a ramifactive, inſtead of a fructiferous ſhoot, of either of which, experiment ſhows it is originally capable. Linnæus ſays, "The perſon "will give a great addition to the ſcience of vegetable "phyſiology, who ſhall ſay what it is, that influences the "extremities of the plant, to break out into flowers and "form ſeeds." But this ignorance extends only to the natural and healthful ſtate of plants: for we know, that art can produce it by lopping, and contamination. It is an odd paradox: but the means by which we give fertility to vegetables, is by weakening the plant, through the effects of the knife, or poiſon. Would not, therefore, this method

method of medicating trees, if found to be really as now preſumed, be a much more certain, and facile way of imparting the proper contamination to them, than any hitherto known? It is, indeed, pregnant with many important conſequences; and ought to be well attended to: and, indeed, we have no reaſon to fear, but that the obſervations, which will be communicated to the Society, and to you, will furniſh us with ſufficient *data*, to form concluſive notions.

The importance, and curious nature of this ſubject, has led me into a longer diſcuſſion of it, than I at firſt intended: and, I ſhall, therefore, cloſe my letter with an intimation, of what I think a material, though ſlight alteration, in the performance of Mr. Bradford's experiment.

He mentions the uſe of *a ſmall wooden plug, for ſtopping up the hole, into which the quickſilver is poured.* In the caſe of young and tender trees, there is a danger of ſplitting part of the wood, by the forcing in ſuch a plug: which would, if the operation were performed on the main body of the tree, be very injurious to it; and defeat the experiment. Inſtead, therefore, of the wooden plug, I would recommend the uſe of a compound, of one part of turpentine or tar, with two parts of bees-wax, melted together; which, being worked with the fingers at the time of uſing, will become ſoft; and being thruſt into the hole, will grow hard again here; and ſecure the mercury, much better than the plug, which is liable to be driven out by many accidents. If, nevertheleſs, it ſhould in any caſe be propoſed to open the hole, to ſee whether the mercury be wholly, or in any viſible proportion abſorbed by the veſſels of the plant: I would adviſe the uſe of bees-wax alone, worked by the fingers into the form of a plug, and uſed as ſuch, leaving a ſmall part out of the hole, compreſſed into the ſhape of a flattiſh bottom. For this may be taken out, or put in again at pleaſure. The avoiding the uſe of a plug, is particularly, and indeed, very eſſentially neceſſary, if the experiment be made on tender ſhrubs, or herbaceous plants: as they might, otherwiſe, be ſplit or wounded in a manner fatal to them.

I hope,

I hope, gentlemen, as the ſeaſon approaches for making theſe experiments, this will find a place in your next publication, which will encourage me to furniſh you with ſimilar diſcuſſions, on ſuch ſubjects as future occaſions may offer; and in the mean time, I ſhall ſoon again trouble you on the important head, *of the production of ſilk in England.*

I am, GENTLEMEN,

London, Your very humble ſervant,
March 16, 1766. AGRICOLA.

NUMBER XXX.

Further Conſiderations on the Effects of the Bounty on the Exportation of Corn; being an Anſwer to ſome Particulars in E. S.*'s Letter in Number* 28. Vol. VI.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

WHAT your correſpondent has advanced, in No. 28. for January, page 16, that it is on all hands agreed, the granting a bounty upon corn exported, has encouraged agriculture, is not conſiſtent with ſome other parts of his letter, where he ſays it has rendered it cheaper upon an average. It may be averred for a truth, that our exports tend to enhance the price, at intervals, above the ability of the labouring people to pay and maintain their families: and, hence, as the number of people are diminiſhed, the farmer loſes his market at home. In the year 1739, or 1740, wheat ſold for ten ſhillings *per* buſhel. This, with the ſtagnation of trade in conſequence of it, made our church-yards reſemble a new-ſown field: and the farmer fails thus of his beſt ſupport. One pariſh in the Weſt was ſaid to pay for fifteen hundred coffins in fifteen months time. In the year 1742, or 1743, wheat ſold for two ſhillings and ſix-pence *per* buſhel. Hence appears the abſur-

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dity of an immoderate price: for, in this manner, it will ever tend to ſink itſelf, and avarice be juſtly rewarded.

The average price, at different periods of time ſince 1594, is of no importance. If we had been informed of the years of dearth, and thrown thoſe out of the account, as unnatural, we might have drawn the average price from the remainder, conſiſtent with the ability of the people. By which, perhaps, the price in the whole period of time might not amount to more than three-and-ſixpence *per* buſhel for wheat.

If the exports, for ten years, amount to no more than one million two hundred thouſand pounds, about one hundred and twenty thouſand pounds, one year with another, is it not highly unreaſonable, the price ſhould be raiſed at home by it, to the amount of five millions *per annum*; and thereby make thouſands wretched: to which we may add, the ruin of the trade of the nation! This is a tax without a name, whereby more has been raiſed, than we pay in conſequence of our great debt.

What is ſaid, that wheat alone has been ſinking for a hundred years paſt, when all other things have advanced, is not true. For what ſpecies, or kind of manufactures, have we, that are not greatly improved, and rendered much cheaper, though the rents of lands were never higher than at preſent; and, have been raiſed, perhaps, in many parts of the kingdom, within the laſt century, a hundred *per cent.*

That the returns made us for corn exported, compenſate for the ſhort harm to particulars, can be advanced only by thoſe, who have no feeling for the wretched. How much more elligible would it not be, in a dull time of trade, to pay a bounty, on our manufactures, for thoſe foreign markets, where we are under-ſold, and thereby enable our people to pay for, and conſume our corn at home? This would produce a neat profit to the ſtate, enable multitudes to maintain themſelves, and pay to the land two-thirds of all their induſtry.

How can agriculture be the mine of our wealth, &c.? Is it not the labour of the multitude, that ſupports thoſe who deem themſelves above work; and thereby enable all, from the merchant to the workman, to pay the great fund to land, which may be deemed its preſent value? Hence, its people being well employed is our mine. Hence, agriculture is raiſed by commerce, and will ſink with it: and, likewiſe, hence, the ſhuttle and flail, furniſh our tables with delicacies, fertilize our lands, reward the huſbandman, guide the plough, and furniſh every bleſſing that animates, and make all rejoice, and be thankful.

The harmonizing agriculture with commerce, may be, perhaps, the moſt important conſideration of the ſtate: but my time will not permit me to ſay more upon it at preſent.

I am, Sir, your's, &c.

A MANUFACTURER.

NUMBER XXXI.

A Letter from Mechanicus, *relating to* Mago's *Inſtructions for the Management of his Farm; with ſome Obſervations on the Nature of Marl.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

WILL you, the Editors of the *Muſeum Ruſticum*, condeſcend to indulge me, the firſt opportunity, with room to acknowledge *a debt of gratitude*, ſo juſtly due from me to *Mago*; for his very kind and much-wiſhed-for advice, that he hath ſo generouſly given me through your obliging channel? A man of a grateful diſpoſition could not, without doing violence to his very nature, reſtrain his pen from offering a tribute of duty, and thanks, on ſo

particular an occaſion: the great diſproportion of circumſtances, poſſibly enhances the obligation. When gentlemen of independent and affluent fortunes are ſo eaſy of acceſs, as to regard thoſe who move in the loweſt ſphere of life, is ſuch a character, that few, very few, I am afraid, will chooſe to imitate. Let me here declare, that I would not be thought guilty of the leaſt degree of adulation, which to a ſenſible man muſt appear in the odious light of ſatire and reproach, and a palpable affront to his very judgment. In ſuch a point of light, I hope I ſhall not ſtand, in having thus ſpoken the genuine ſentiments of a heart warm with gratitude.

I am perfectly convinced of the juſtneſs of *Mago*'s advice; and intend, as far as I am able, punctually to adopt the whole of what I am directed, in his letter inſerted in your laſt *Muſeum*, as ſoon as I have a convenient opportunity. Sometime before I received his kind letter, I had opened ſome gutters in the ſame piece of land, mentioned in my queries; which have already had a very conſiderable effect, by draining off the ſuperfluous moiſture. I can perceive it to be leſs poachy than ever I remember it to have been before at this ſeaſon. Happily, there is, in the ſame piece, a conſiderable quantity of ſtones, that are now an incumbrance: but which may, upon *Mago*'s ſcheme of making drains with them, be converted into a real and permanent advantage. I cannot help believing, that Philomath (to whom I am very much obliged) is not much acquainted with marl; as I clearly expreſſed in my queries, that the land was light and ſpongy, and conſequently wants ſolidity to ſupport any uſeful crop to advantage. I had conceived, that marl would give it ſuch a body; and, with that view, I was more particular in my account of it. I wiſh I had been more explicit in my queries, I had not then led *Mago* into an error, by ſuppoſing all my land was of the wet and poachy kind, for I have twelve or fourteen acres of as fine a ſoil, rather inclined to gravely, as moſt is, the management of which, I was at no loſs about, as I concluded its

natural manure muſt be marl *, of which we have plenty. I only meant, that this part, through neglect, was covered with docks and thiſtles; but as to the wet and poachy piece, I was utterly at a loſs how to manage with any proſpect of ſucceſs. I, alſo, mentioned, or at leaſt, intended to do ſo, that I had ſome other material petitions relative to ſome meadow-land, whoſe ſituation has ſeveral peculiarities; and I cannot but believe, it would be of great uſe to the public, to know the proper management neceſſary to improve ſuch kinds of meadow-land. Gentlemen, if it were my intention only to follow the common methods of huſbandry, ſurely I had been unpardonable, to have given you any trouble, by requeſting you, or your correſpondents, to have inſtructed me, with what I might have had from my neighbours. No, gentlemen, my deſire and intention is, to practiſe every new and rational improvement, that I can diſcover to have the appearance of reaſon to recommend it.

I hope, gentlemen, it will not be thought inconſiſtent with the utility of your plan, to advance, by way of hypotheſis, what occurs to me on the nature and properties of *marl*, which I take to be of a *ſoapy*, or *unctuous* texture, eaſily diſuniting into very minute particles, conſequently well adapted to inſinuate itſelf into the interſtices of the more or leſs compact varieties of *ſoil*. If this be allowed, it will have a double effect, firſt, in opening or diſuniting the more ſolid kinds of *earth*, by the ſuppoſed minuteneſs, lubricity, and great diviſibility of its particles; and thence preventing, by its intervention, the coheſive nature of the compact, homogenious earthy *bodies*. Secondly, in filling up the chaſms, or the too great vacuities in the lighter kinds of *earth*; which are the faults to be remedied in this kind of land, which want more ſolidity. Surely nothing in nature can be better adapted than *marl*, to give it ſuch

* I took the advantage of the froſt this winter, and marled three acres of this land upon the turf; I propoſe to plough it next ſpring, and ſow it with peaſe. If that crop proves good, I imagine it will afterwards do for wheat. *Mechan.*

a body;

a body; and it alſo prevents, or retards the rain from too quick a deſcent, by its *unctuous quality*. I beg leave to oppoſe theſe humble hints, to the doctrine of *fermentation*, which I think *marl* cannot be poſſeſſed of in a degree equivalent to its well-known laſting and prolific power. If *fermentation* be the only cauſe (as I have ſomewhere ſeen aſſerted) of that allowed prolific power, inherent to *marl*, the effect muſt then ceaſe, when *fermentation* is at an end: which, if any at all, muſt, I conceive, be but of a ſhort duration. The prolific power of *marl*, mixt with a proper *ſoil*, is of a much longer continuance than can be reaſonably allowed to *fermentation*. Therefore, I would beg leave, to conclude, that the prolific effect of *marl* *, is cauſed

* We are willing to give a place in the *Muſeum Ruſticum*, to any ingenious opinion of your correſpondents: but in ſo doing, we hope it will not be in the leaſt underſtood, that we make ourſelves anſwerable for them, as giving any other kind of ſanction.

The knowledge of the principles of vegetation is, at preſent, very much confined. We neither demonſtrably underſtand what is the real *pabulum* of plants, nor the particular manner in which the various kinds of bodies, not themſelves the *pabulum*, are, nevertheleſs, neceſſary, or conducive to prepare it for, or convey it to them. Both which are very requiſite to be comprehended, before we can, with any juſt hopes of ſucceſs, attempt to form theories, to account for particular effects of bodies in fertilizing plants. In order to make any certain advance towards diſcoveries, relating to the peculiar modes, by which myſterious effects in vegetation, are produced, it is neceſſary to be very accurately and minutely acquainted with natural hiſtory, and chemiſtry. For how can we pretend to form notions of the particular manner of action of thoſe bodies on each other, of whoſe diſtinct and reſpective qualities and properties we are ignorant? It is with regret, therefore, that we ſee thoſe, who are not well acquainted with the previous principles to ſuch inquiries, frequently undertake them; and jumping to concluſion, over all the neceſſary premiſes. Hence we ſee ſome mechanical reaſon advanced to explain, in a ſimple way, what depends, perhaps, on the moſt complicate co-operation of the chemical qualities of bodies, that have no concern with their gravity, texture, figure, or any of their general properties: or we ſee ſome crude notion of *fermentation*, ſolution, &c. groſsly applied, where it has none, or perhaps a very partial relation to the ſubject in queſtion. It is one thing to form practical theories from obſervations on the immediate

cauſed by the ſoil aſſuming a different texture, better ſuited to the nature and *œconomy* of *vegetation*. And what further convinces me of the truth, of what I have above advanced, is, that the effects of *marl* are not diſcovered in any great degree, until the *marl* is thoroughly mixt or incorporated with the ſoil: which, I think, is an obvious proof of what I have ſaid on its properties. I could inlarge a great deal on this head, but would rather chooſe to ſuſpend any further remarks, leſt I may give umbrage to abler pens, who have eſpouſed the principles of *fermentation*, as abſolutely neceſſary to *vegetation*. I would here beg leave to premiſe, that I only intend this as a ſketch, and much wiſh to ſee the ſubject, handled, more at large, by more maſterly pens, and penetrating heads. I could wiſh to lead *Mago* into the diſcuſſion of this article, I ſhould then have the ſatisfaction, to ſee ſome maſterly ſtrokes diſplayed on a ſubject of no ſmall importance, to the improvements in agriculture, by this almoſt univerſal, and natural manure.—Perhaps, it may be ſaid, by ſome, that are more critical, than good natured, who made you a teacher? Is this Mechanicus? You, who but a few months paſt, was the humble petitioner. Does the haughty *Plebeian*, preſume to commence inſtructor, and dogmatically inſult his ſuperiors? To which I anſwer, No, all, I aim at, is a candid diſquiſition, and an uſeful reſearch after truth, not only in this, but in every point, both of practical and ſpeculative knowledge. By

immediate conſequences of things, preſented by natural accidents, or artificially produced: and another to dive into the ſecret philoſophic principles of the cauſes. The firſt is in the reach of every ſenſible perſon, intelligent in general matters: the other requires very extraordinary acquired qualifications, as well as great natural ſagacity and penetration. It is, therefore, to be wiſhed, that the firſt, which is of more immediate good conſequence to the cauſe of agriculture, ſhould be the object of attention to all who have opportunities to cultivate it: and that the other ſhould be left to perſons, whoſe ſituation and qualifications, enable them to purſue the abſtract ſtudy and nice courſes of experiments, neceſſary to the forming *ſyſtems* of principles; for, in theſe matters, nothing can be either well underſtood, or communicated in a detached manner. R.

comparing

comparing oppoſite things, and qualities, ſometimes the truth is diſcovered, which before had lain dormant, by implicitly receiving, what had been affirmed by thoſe, whoſe figure and authority, had given, ſome particular tenet, the current ſtamp of truth. Nothing can be a ſtronger illuſtration of this point, than the univerſal eſtabliſhment of the Ptolemaic Syſtem. The inference, I would draw from this, is, that ſo many ages, of ſuch elaborate, and ſtudied miſtakes, ſhould inculcate this uſeful leſſon, to make us humble in our opinions, in ſuch purſuits, wherein the human faculties can have no certain ideas to direct their knowledge beyond what nature deſigned us.—I have wrote (I am afraid) a long letter upon a ſubject, that both the editors, and correſpondents of the *Muſeum Ruſticum*, will ſay is little to the purpoſe.—I can ſay but little to the contrary, and to ſay any thing, by way of excuſe, will only add more to much leſs purpoſe. I will, therefore, only make this further obſervation, that I heartily join with *Mago*, whoſe letters are an ornament to the *Muſeum Ruſticum*, that Mr. Scott owes him, and the *Editors*, very particular acknowledgements. Mechanicus, who lies under no leſs an obligation, will in due time remember to give a faithful account of his ſucceſs: and, in the mean time, I am, moſt ſincerely, *Mago*'s, and the *Editors*,

Obliged humble ſervant,

Near Stafford,
March 16, 1766. MECHANICUS.

P. S. Gentlemen, if you think the following account any curioſity, deſerving a place in your repoſitory, I ſhould be glad to ſee it publiſhed. On Monday laſt, was killed, at John Stubs's, gentleman, of Ranton Abbey, near Stafford, a bull, whoſe age and time of feeding I have no account of; the weight of this extraordinary creature was given me, by the above gentleman, at my requeſt, the veracity of which may be relied upon. I cannot but believe, this curioſity will be acceptable

both

both to the editors, and purchasers of the *Museum Rusticum.*

The particulars of his weight.

The head	56
Blood	59
Inteſtines	339
Feet	36
Hide	172
Tallow	147
One fore-quarter	468
Other ditto	460
One hind ditto	346
Other ditto	331

Total weight 2414 pounds.

NUMBER XXXII.

Some Obſervatians on the Premiums offered by the Society, for a Machine for ſlicing Turneps; on the Nature, Culture, and Uſes, of Turnep Cabbage, and on the Advantages of the Drill-culture. In a Letter from Mr. Wynne Baker *to the Editors.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I HAVE juſt received No. 27 and 28 of your work, in which I find two letters from your correſpondent Agricola, who appears to be a member of the Society for promoting arts.

I cannot but feel great happineſs, that my labours coincide ſo much with the views of that Society, as to induce them to offer premiums for promoting any thing, which I have recommended to the attention of the farmer, to whom, I really wiſh to be ſerviceable.

I ſhall

I ſhall juſt beg leave, to return my thanks to Agricola, for his candour and politeneſs towards me, in his treatment of the two ſubjects, (in his letters, one in No. 68. Vol. V. and the other in No. 9. Vol. VI.) which have ariſen, from my report to the Dublin Society for the year 1764. Writing is not a buſineſs, that I am by any means fond of: but, where I think it my duty, I ſhall always ſacrifice my more intereſting entertainments of the field, (do not apprehend them to be either hunting or ſhooting) to the employment of my pen.

Firſt, the letter, No. 68. p. 316. Vol. V. from Agricola, ſeems to require ſome obſervations to be made by me, as I appear to have been the *cauſe*, though *not the author* of that ſubject.

I honour the Society for their laudable deſign, in attempting to obtain an inſtrument for the cheap and expeditious ſlicing of turneps: but I muſt beg leave to obſerve, that to ſlice them for ſheep is quite unneceſſary. Agricola ſays, p. 387. "they make great waſte * of them (turneps) "by ſcooping out the middle, and leaving great part with "the rind and ſkin." This will always happen, when the ſheep are paſtured upon the turneps in the field where they grow; but if they are drawn, and laid upon paſture or meadow land, there will be very little waſte; for in a manner, the ſheep will eat them clean up, ſhells and all: of which excellent practice, and the profitable conſequences, you will very ſhortly have an opportunity of communicating ſome account to your readers, from my report to the Dublin Society, for the year 1765. But, as to its being urged, that the accident of choaking horned cattle, does not ſo often happen as to counterbalance the ex-

* Agricola here only gave the reaſons, urged to the Society for the eſtabliſhment of the premium for the ſlicing machine; which were not founded ſolely on the facts in Mr. Baker's report; but, on the information alſo of a number of gentlemen during the debates on this matter: and among them, ſeveral did ſtrongly inſiſt on the expedience of ſlicing the turneps for ſheep under certain circumſtances. E. O.

pence, of ſlicing the turneps, I muſt join with Agricola; and do again repeat it, that ſlicing the turneps for them is *neceſſary*: in order to convince my ſhepherd of which, (who thought it an act of ſupererogation) I threw a turnep about as big as an half-penny loaf to a cow, and obliged him to ſtand with me to ſee the diſtreſs of the beaſt, in her attempts to maſticate the turnep, which was attended with ſuch difficulty to her, as convinced him of the prudence of the practice.—I would urge again, in defence of the practice, that ſuppoſe a man were to loſe a beaſt of five, ten, or fifteen pounds value, would not that loſs have paid for the ſlicing ſome hundred tons? Beſides, the turneps, which are raiſed in the common huſbandry, will be more liable to choak cattle, than thoſe raiſed in the drill: becauſe there are very few drill-turneps, if properly cultivated, that cattle can get into their mouths; but they will bite off large pieces, which is too ſlow a manner of eating for a *feeding* beaſt, or a working bullock, both which, ought to have their food ſo ſuited to their manner of eating, that they may ſoon fill themſelves, and then take their reſt.

I muſt obſerve to Agricola, that I do not think, I incurred any other expence * in ſlicing my turneps, than what the candles coſt which were conſumed in that buſineſs; for if my people had not been employed in that, they would have been idle; and had I wanted more than about nine hundred weight in each day, I could have ſliced them, as I ſeldom employ leſs than from twenty to forty, or fifty men and boys.—I muſt further obſerve, that inſtead of ſli-

* It does not ſeem to invalidate the force of Agricola's argument, that Mr. Wynne Baker incurred no expence, but that of the candles, by employing twenty or thirty men and boys, two hours every day, who would otherwiſe have been idle at that time, in ſlicing the turneps; as others who have many more beaſts, may happen, by having leſs tillage, on their hands, to have much fewer people; or may find other profitable employment for them: and, therefore, the value of the work muſt be certainly taken into the account in ſtating the comparative advantages or diſadvantages of any particular methods: however, it might chance to be in his peculiar caſe. E. O.

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cing the turneps with ſheers *, I always uſe butchers knives, ſtrong in the back, and about a foot long; ſhorter knives will not make any diſpatch, with my large turneps. We place planks, or ſtrong ſticks over the tubs, to reſt the turneps upon; when it is a pleaſing ſight, to ſee the people at the work, there being a conſtant emulation amongſt them, contending who ſhall do moſt. But, upon the whole, whether the machine ſhall be compleated or no, I earneſtly recommend, as a method, to leſſen the hazard of choaking black cattle, at leaſt an hundred, I might ſay, I think, a thouſand degrees, to cultivate turneps in the drill way, which being properly perſued, will, I do believe, always exceed the broad-caſt, and hand-hoeing, in point of produce; beſides, the object of being leſs expenſive, and always leaving the ground, in an higher ſtate of perfection, than can poſſibly be in any other huſbandry: which, *practice* has ſhewn with me, beyond contradiction.

I come now to ſpeak of the turnep cabbage, upon which Agricola has been very full: but, as I have had long experience of its ſuperior excellence, and that I ſee it warmly adopted by your Society, I think myſelf bound to give ſome further information, as to its nature and culture, for the benefit of your readers, as well as for the credit of the plant.

I have never ſeen the long ſpecies † of this plant, as deſcribed by your correſpondent, p. 50 of your Sixth Volume:

* Mr. Baker is very right, that he uſed no ſuch expreſſion in his report, as the cutting turneps with *ſheers*; nor indeed did Agricola in his letter: as appears, as well on the examining the manuſcript, as by ſeveral other paſſages, where he ſays, the only method in uſe in theſe countries, is by the ſlicing with the *knife* and hand only. It was a typographical error, which happened to eſcape correction: and which, we are glad to have this opportunity of explaining to any, who may have taken the ſame notice of it. E. O.

† Agricola, in the paſſage of his letter here referred to, only ſays, that Gerard mentions two kinds of turnep cabbage, of which his long ſpecies was one; and that he gave prints of them, which are alſo exhibited, at Agricola's deſire, in our

lume: though I do not think it improbable, but there may be ſuch a ſort; as it is really ſurpriſing to ſee how nature has ſported, in her variations of the plants, which we bring under the articles *braſſica* and *rapa*. But, I once had a degenerated ſort, ſimilar to that which Agricola has deſcribed: which happened by my gardener's attempting, to raiſe the ſeed of the turnep cabbage, very near ſome borcole, of which we raiſed the ſeed the ſame year; but when I made that diſcovery, I baniſhed the ſpecies, and had recourſe to the original ſort, which I now have in full perfection: and by the demands for the ſeed, have the pleaſure to find, many gentlemen in this country, are embarking in the culture of it: which I hope will, with the premium offered by your Society, be a means of introducing it into general uſe.

I have had them weighing fifteen pounds; but I never had more upon an acre, than is mentioned in my report, including the leaves and turnep, excluſive of the roots.

I heartily wiſh, to hear of the culture of this plant being generally eſtabliſhed: and as from my experience of it, your readers may perhaps be induced, to pay ſome attention to the culture, which I ſhall adviſe. And, therefore, I earneſtly recommend them, not to diſgrace the plant, by expecting it to proſper in poor ground; but that they will afford it ground well reduced, and enriched with manure. That they raiſe the ground in ridges of five feet broad; to do which, will require three bouts of a plough, *i. e.* ſix furrows; and let the ridges be raiſed as high as may be, (which, by ſo much, will encreaſe the depth of the pulve-

work. He further mentions, that on examination, he "neither "has ſeen, in any garden, nor finds any traces in the later "writers, of more than one kind of this plant." So that it is not extraordinary, Mr. Baker alſo ſhould not have ever ſeen the long kind, as an eſtabliſhed ſpecies: but the fact he mentions, of ſome plants greatly reſembling this, as deſcribed by Gerard, ariſing from the cultivating the turnep cabbage near borcole, ſupports much Agricola's conjecture, that what Gerard ſaw was a ſeminal degeneracy: notwithſtanding Mr. Miller, in his Dictionary, ſays, "this kind of cabbage never varies." E. O.

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rized earth) and then harrowed; which ought to be done with what, I call my drill harrows, that do the buſineſs moſt conveniently: but rather, than ſuffer the common harrows upon the ridges, which would throw them down, let them be raked, on the crown, with iron rakes; which may be done for about twelve pence an acre. On each ridge, let there be planted, only *one* row along the middle; and the plants two feet from the middle of one plant to another, as has been my general practice: but never let them be put nigher than eighteen inches, and let them be horſe-hoed in the manner my report deſcribes.

Under this treatment, if the ſeaſon be favourable, and the ground good, the leaves of the plants will grow to meet from row to row.—I am very ſenſible, from long and repeated obſervations, that many people will not be ſatisfied with the great ſpaces I propoſe: but they cannot *effectually* horſe-hoe the plants, if the rows are nigher together: which, practice has taught me, is a circumſtance of great importance; and, therefore, I hope, whoever attempts the culture of this plant, will be attentive to it.

To ſhew that cattle are fond of this plant, I am to inform you, that twenty head of my black cattle broke into my cabbage field in the night, ſome months ago, when they eat more of the turnep cabbage than of all the other kinds: of which, I think, there were fifteen ſorts planted, by way of experiments.

I am very happy to ſee, that Agricola enters ſo warmly into my wiſh, of introducing this plant on board the navy: as it is an object, which has dwelt upon my mind for ſome years. And I really have warm hopes, that it may be attended with very happy conſequences; as you may ſee by my preface to my report.

If any further information on this ſubject ſhould be thought neceſſary, that is in my power to furniſh, I ſhall moſt chearfully communicate it for the benefit of your readers and correſpondents: amongſt the latter of whom, I ſee you have ſome, who are entering upon the drill huſbandry: from which circumſtance, they have my

warmeſt good wiſhes: and, therefore, I ſhall juſt beg leave, earneſtly, very earneſtly, to recommend to their cloſeſt attention, two particulars, upon which depends the ſucceſs and credit of that ſyſtem.—Firſt, that in their firſt attempts, they do not aim at the doing a great deal; and, ſecondly, that they attend moſt minutely to the important and very capital points of having their ground *well reduced*, *perfectly clean*, and poſſeſſed of ſome *tolerable degree of richneſs*. To obtain theſe three material objects, nothing is ſo effectual, as to ſow turneps in drills for the firſt crop, in every field which is intended for the drilling of corn.—A love of this ſyſtem, the honour I bear to the memory of the ingenious Tull, my own experience, and an ardent deſire to ſee the too much neglected ſyſtem of this ingenious, very ingenious man, eſtabliſhed in his native country, induces me to throw out the above caution.

To return to my ſubject again, I muſt beg leave to ſet Agricola right in one particular. He ſays, page 46, Vol. VI. ſpeaking of the turnep cabbage, "The ſtalk, "after riſing of the uſual thickneſs, and in the manner of "other cabbages, enlarges ſuddenly to ſuch a degree, "that it forms a knob, *&c.*" He will permit me to inform him, that the knob or turnep appears by the time the leaves arrive to ſix or eight inches long, and continues to increaſe regularly, till it arrives to its full magnitude *.

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* Mr. Baker has certainly much miſtaken Agricola's meaning, as to the matter in queſtion. In deſcribing the figure of the turnep cabbage, Agricola ſays, that "the ſtalk, at ſome diſtance "from the ground, after riſing of the uſual thickneſs, and in "the manner of thoſe of other cabbages, enlarges ſuddenly to "ſuch a degree, that it forms a knob, of the magnitude of a "common turnep." The uſe of the word *ſuddenly*, has obviouſly occaſioned the ambiguity, that miſled Mr. Baker, as to the ſenſe of this paſſage: for undoubtedly Agricola did not intend it to have any relation to the time of the knob's being produced, but merely to the form of it, with reſpect to its going off by a quick projection, without a *gradual enlargement* of the ſtalk: and, in this manner,

There remains, gentlemen, two articles of information for me to furniſh, in order to render my comparative experiments more intelligible to the bulk of your readers.

Wherever an acre of land is ſpoken of in my report to the Dublin Society, I always mean what is here underſtood to be an acre, which is called by the name of *plantation acre*. *Five* of which acres, make *eight Engliſh and fifteen perch*, ſtatute meaſure.

The corn in this country is not ſold by meaſure, but by weight, which I mentioned formerly to you, Vol. III. p. 74. and as it is material, to the forming a judgement of my experiments, I am to inform you, that the barrel of wheat here is two hundred and eighty pounds. The barrel of barley, and beer, two hundred and twenty-four pounds. The barrel of oats one hundred and ninety-ſix pounds. The barrel of peas two hundred and eighty pounds; and the barrel of potatoes two hundred and eighty pounds.

It is now, gentlemen, about nineteen or twenty months ſince you gave us ſome expectations of a Farmers Dictionary: I have for ſome time paſt wiſhed to ſee it introduced in your work, as you promiſed; as I am perſuaded it would be very uſeful, in making your readers mutually acquainted with the terms and phraſes uſed in the different parts of England amongſt the farmers.

This letter is much longer than I intended, when I ſet down to write it; and, therefore, I ſhall conclude, with only ſuppoſing, that it will be to no purpoſe for

manner, the expreſſion *ſuddenly enlarging*, has been generally uſed by botanical, and many other writers, in ſimilar caſes. From ſeveral circumſtances, we conjecture Agricola to be very converſant with the hiſtory of plants: and can, therefore, ſcarcely ſuſpect him to have fallen into ſuch an error, as to imagine, that a ſtalk of a plant, like thoſe of cabbages, ſhould be ſuddenly, in point of time, converted into the form of a common turnep: which transformation is ſo unlike any thing elſe in the vegetable œconomy, that it would almoſt require a miracle for its performance. E. O.

me to attempt the appearing again in your work, at leaſt on the ſubjects which this letter contains, under an anonymous name; and, therefore, I ſhall, for this time, ſubſcribe my real one.

I am, GENTLEMEN,

Your very humble ſervant,

Dublin,
March 6, 1766.

JOHN-WYNNE BAKER.

Muſeum Ruſticum, &c.

For APRIL, 1766.

VOLUME the SIXTH.

NUMBER XXXIII.

Conſiderations on the Advantages, that might accrue, from the Eſtabliſhment of County Societies for the Encouragement of Agriculture; and ſome Hints for the Regulations of ſuch Societies.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN your laſt October and November number, I took particular notice of a paſſage, (in a letter ſigned Agricola, on the ſubject of the means of improving agriculture,) reſpecting county or neighbourhood ſocieties: of which, he ſaid, there was one eſtabliſhed in Brecknockſhire; and, as he believed, one or two more in ſome other parts. I wiſh we were more particularly informed of the ſucceſs of theſe attempts; but, whatever that may be, I moſt heartily agree with Agricola in his notion, that the forming ſuch, in other places, would be a very effectual method, both of augmenting the taſte and ſpirit for im-

proving husbandry in men of fortune; and of imparting it to their inferior neighbours who have farms: and I think, also, as he further added, that if the result of the experiments and efforts, made by their encouragement, were to be communicated to the public through the channel of your *Museum*, or in any other proper way, that useful knowledge, of which, such endeavours could not fail to be a very copious source, would be adequately spread throughout the British dominions. I have since ruminated several times on this matter: and been sollicitous to have it again urged to the public, either by Agricola, or some other capable person; or, in default of that, to have sent you some observations of my own concerning it. But, on reading the St. James's Chronicle of March 29, I find it has been taken up by another, who makes it of such importance, that he seems to think, it might have an operation equal to the bounty on the exportation of corn: and that it is an object of parliamentary consideration and provision. I cannot say, that I altogether come into this gentleman's notions, either as to the probability or expedience of the government's revoking that bounty, and substituting a fund for county societies for giving premiums on the score of husbandry. They are things of a very distinct nature: and, though they may both be meant to tend to the same end, that is, the extension of agriculture; yet they operate by means so different, that I cannot think one at all a natural substitute for the other. The forming such societies is, in itself, unobjectionable: and at all adventures eligible. The bounty is of more dubious consequence, at least in some conjunctures, as appears by the variety of opinions supported on both sides, by very plausible arguments, and by the very cautious deliberations of the government: but if it be a good measure, one would rather wish it to subsist concurrently with the other, even for the sake of that, than to be discontinued under the notion of making way for it. I hope, likewise, that there is public spirit enough to provide the moderate funds, which may be wanting for the disbursements of such societies, if they could

could be formed: eſpecially if the premiums were to be, as they certainly ought, for the moſt part honorary. I know there are ſome who would diſpute this point; and ſay, that honorary rewards could have no influence, as to farmers, or the lower rank of people: but I am ſatisfied from obſervation on common facts of the contrary. There is an emulative ſpirit of excelling in certain matters, belonging to mankind, independent of rank or education; which rather ſeem only to change the particular object, than to be the original cauſe. This is extremely manifeſt, by the great exertion we ſee in people of the meaneſt claſs, to gain a triumph, or carry away a prize in the ruſtic games and exerciſes; as foot-ball, cricket, wreſtling, or cudgel-playing; which evinces, that the ſame ſpirit prevails as well in the loweſt as higheſt ranks; and, perhaps, with a more powerful enthuſiaſm, where this paſſion is excited in them. But there is an inſtance to be given more particularly cloſe to the preſent purpoſe, than thoſe I have here referred to. It is the ſucceſs of a trial of this point made by a perſon of diſtinction in France, well known for his earneſt application to the improvement of agriculture, and by his being at the head of one of the provincial ſocieties, eſtabliſhed for that purpoſe, from whence he correſponds with the London ſociety. This gentleman offered his tenants and neighbours honorary premiums, for excelling, in certain particulars, reſpecting agriculture; which they exerted themſelves, with the moſt ardent efforts, to gain: and, having obtained them, wore them round their necks, at certain times of the year, in the field, as *inſignia* of the honour they had obtained; and were not leſs fond and proud of them, than a marſhal or general would have been of thoſe of ſome ſplendid order of knighthood. If the depreſſed peaſants of France be capable of this ſentiment; ſurely it is not wanting in the breaſts of the more liberal, independent, and ſubſtantial farmers of Britain. Honorary premiums would, therefore, I doubt not, have their due effect in all caſes where no great expence is incurred, nor hazard run, in the attempt to obtain the prize: and

the other caſes are ſo few, that a moderate proviſion for them would be ſufficient. In this light, therefore, the aid of government would not be wanting to ſupport them: as a private ſubſcription, fully ſufficient, would certainly be obtained with eaſe. But if the pecuniary ſupport of government be not neceſſary, any other interference would be leſs ſo; or rather, perhaps, greatly obſtructive of the end. For in this country, or perhaps all others, whatever has any concern with the adminiſtration, is apt to become the object of party regard: and this would introduce ſuch principles into the conduct of a ſociety of this kind, as would greatly interfere with, or poſſibly wholly exclude thoſe motives and ſentiments, which alone can produce the juſt appointment and diſpenſation of rewards for merit in this way.

I wiſh Agricola, or ſome gentleman, who is well acquainted with the œconomical hiſtory of the ſocieties of this kind, would give a plan, or, at leaſt, a ſketch of the regulations proper for ſuch an inſtitution: and, in the mean time, as an incentive to the ſpirit which muſt actuate individuals to begin ſuch an attempt, that you would publiſh along with this the letter which has made the principal ſubject of it. For, though I cannot agree with the writer of it, in the particulars above mentioned, of wiſhing the government to undertake this matter; yet, I think, the other parts of it very ſenſible and juſt; and that they may conduce much towards a proper attention to this material deſign. In ſo doing, you will oblige

A conſtant reader,

And well-wiſher of your Muſeum,

W. Z.

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An Attempt to prove, that the Cultivation and Exportation of Corn may be ſtill more efficaciouſly encouraged, by a Method ſubject to none of the Inconveniencies, and much leſs expenſive than the Bounty; humbly offered to the Conſideration of the Legiſlature.

IT is well known of what infinite ſervice the eſtabliſhment of one private patriotic ſociety has been to the public; but by its being removed out of ſight, as it were, ſcarce one farmer out of ten, nay, not one in a hundred, at a diſtance from the metropolis, is even acquainted with its exiſtence: but how much greater, how much more general, would be the influence of ſo powerful a ſpur to induſtry, if, by the eſtabliſhment of a like ſociety in every county, and the yearly diſtribution of prizes in its capital, it became the conſtant topic of every countryman? Every premium it propoſes would be known, and be within the reach of every farmer; and by thus conſtantly propoſing to each the means of triumphing over his neighbour, would neceſſarily engage the attention even of the moſt indolent. The ſociety ſhould be compoſed of the moſt independent gentlemen of the county, with proper power to enlarge or ſupply their numbers. To avoid every idea of lucre, they ſhould not only give their attendance *gratis*, but as an earneſt to the people of their diſintereſted views of encouraging the object of their meetings, each member ſhould, at leaſt, ſubſcribe a guinea *per annum* to the ſtock allowed by parliament. To a ſufficient number of them muſt be committed the care of regulating and publiſhing the premiums; which ſhould be done by bills paſted up on each pariſh church and market croſs. They muſt ſuperintend, and be preſent at the trials, and receive the affidavits, neceſſary for fixing the reality of the ſeveral pretences of the candidates. With regard to corn, to the encouragement of which the premiums are chiefly to tend, it is neceſſary thoſe trials ſhould be by the hundred weight, and not by meaſure, as the only ſecure method of fixing the

value

value of it. When the ſeveral claims are adjuſted, a day ſhould be fixed, on which a ſufficient number of the members are to attend, to diſtribute the ſeveral prizes and medals in the moſt public manner, accompanied with every thing that can add dignity and importance to the occaſion; after which an entertainment is to be given, in the town-hall, at the ſociety's expence, to which each perſon, who has obtained a premium, ſhall have a right to invite a certain number of his friends: as for example, the firſt premium ſix, the others three, to whom tickets ſhall be given. Along with the money allotted for each premium, ſilver medals ought to be given to the perſons to whom they are adjudged; on one ſide of which is to be engraved the perſon's name and place of abode; on the other, the object of it; and if that be corn, the number of acres, and the quantity *per* acre by which he obtained it; the particulars of theſe to be enrolled likewiſe in a book, kept by the ſociety for that purpoſe. With regard to the objects of the premiums, as before ſaid, their chief tendency ſhould be to the encouragement of bread-corn; the plenty of which is the firſt point to be obtained: but as the good culture, neceſſary for the producing of barley and oats, and even artificial graſſes, is a real, though a more diſtant preparation of the ground for the bearing of wheat; and they too are neceſſary for the ſubſiſtance of the huſbandman and his cattle, they will not improperly be allowed ſome ſhare in the premiums, and to render the inſtitution ſtill more extenſively beneficial, ſuch other crops too, as hops, woad, madder, hemp, flax, rape; with inventions, which have an immediate relation to huſbandry, and ſuch manufactures as work up materials, producible by the ſoil of the ſeveral counties; the planting of foreſt-wood, and even willows, as uſeful to the farmer, ſhould be allowed a place in the diſtribution; for though theſe have not an immediate relation to that branch of trade, for which the bounty is at preſent given; yet they all contribute to the general improvement of agriculture, and by procuring general plenty, enables the huſbandman to carry on his work with greater

facility. The manufactures here mentioned, conduce to his general profit, and muſt be allowed to conſtitute the only ſolid baſis of a truely advantageous commerce.

NUMBER XXXIV.

An Account of an Improvement in the Method of ploughing Ground, by Means of a Plough of a new Conſtruction (here deſcribed) *by which much greater Crops may be obtained, without any additional Expence or Labour, than by the Uſe of the common Plough; with Obſervations on the Effects of frequently repeated Stirrings of the Soil; and the comparative Benefits of that, and laying on Dung.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I HAVE but little time on my hands: but ſuch is the advantage to the nation, of properly ploughing the ground, that I willingly offer my beſt aſſiſtance, in this particular, to any of your readers, who may think fit to try the event of what I adviſe. Were the common ploughs without wheels, faultleſs, ſuch is the cuſtom of the greateſt part of ploughmen, in holding the right-hand higher than the other, for the greater eaſe to themſelves, or a ſightly ſurface, to mend the defect of the plough, that the ground cannot be properly prepared beneath, to give the fibres of the roots of the corn free admiſſion into every receſs, in their ſearch after nutritive principles, in order to carry on vegetation, according to the true biaſs of nature; and to bring the crops to their deſtined maturity *. I beg leave, therefore,

* Both we, and the public, are much obliged to Mr. Ladnar for this ingenious and important communication. There can be no doubt of the certainty of the principle, *that the expoſure of the earth to the air*, by frequently repeated turnings up of the ground, will fertilize and enrich it, as well as manure, in ſoils that are naturally,

therefore, to recommend the making of a double plough, with the following proportions. Let it be eighteen inches in the tail, and three feet in length; with a double ſhare, eighteen inches from wing to wing; and two mould boards, which ſhould have a pretty ſharp turn. This plough will work very well in all ſoils; which are not of the ſtiffeſt nature: and the ploughman cannot eaſily hold it otherwiſe than even, without ſome pain to himſelf. Now, if the owner pleaſes to recollect, he will find he muſt make quicker diſpatch in ploughing his ground; and, not only ſo, but give the land two ſtirrings. In the common mode of fallowing, every bout the team goes; that is, in the uſual way; he cuts nine inches of ground, and one ſtirring in ploughing his field throughout: but, in this, he cuts eighteen inches at a time; and, when the whole is once ploughed throughout, he will have ſtirred it twice: which has the effect of two ploughings for one in the common method. It may ſeem, that a double draught will be required to work this plough: but this is far from being the caſe; as I have frequently experienced: and the reaſon ariſes from this, that the ſhare point always exactly follows

naturally, or have been brought to be by art, of a due looſeneſs of conſiſtence: or, in other words, are not too ſtiff to be broken into ſmall parts. This doctrine is manifeſtly verified by ſome late accounts given in to the Society for promoting arts, &c. of the comparative advantages of the drill or broad-caſt methods of culture; where the purpoſes of dung appear to have been entirely anſwered by the manner of tillage in the drill culture; and, taking the term of five or ſix years together, greater crops obtained by that method, than were formerly in the ſame period from the ſame land in the broad-caſt way, by the common courſe of fallowing, and the uſe of manure. The extenſion of any improvement, which renders manure wholly, or in part needleſs, cannot but conduce greatly to the advancement of agriculture: becauſe the limitation of the quantity of ſuch manure, &c. which neceſſarily riſes in its price, according to the increaſe of the conſumption of it, in any neighbourhood, gives a proportionable limitation to that improvement of land which depended on it. But mechanical operation may be practiſed unlimitedly, and is, therefore, an inexhauſtible reſource of the benefits which accrue from it. A. R. E. T.

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the horſe's path; whereas, in a ſingle plough, the ſhare muſt point to the left, in order to balance the reſiſtance of the mould-board: whereby, the horſes have more labour, than if the ſhare pointed directly after them, as in my method. Beſides, in the common plough, the ſhare muſt incline downwards, in order to balance the defect of the angle made by the beam, and the ground; otherwiſe, the horſes would pull the ſhare upwards; and this neceſſary tendency of the ſhare to point downwards, occaſions alſo much labour to the horſes.

Great is the benefit to the owner of the ground, by uſing this plough: as every intelligent man in huſbandry muſt acknowledge, the more ſtirrings of the ground the better crops. In the common method, there are four ploughings, we will ſuppoſe, commonly practiſed; which will give only four ſtirrings: but, by this double plough, there will be eight ſtirrings from four ploughings; and the owner need not be ſurprized, if he gets as good a crop by theſe four ploughings, according to my plough, without dung; as he can with four, by the common plough, with dung: provided he will begin his fallows before the winter, and will ſee the ploughings made in all ſeaſons when the ground is in proper temper to bear the horſe's tread. It will be very favourable to the crop, if the ground will admit of croſs-ploughing, as it will remedy any heedleſsneſs, in the ploughman, if he have failed to hit the ground in entering the plough, every time he turns on the headlands, or do not keep a due diſtance from each furrow in bouting: which he may eaſily do, if he pleaſes.

The reader need not be told, that, after the firſt ploughing, the ground lies in ridges; and that, at the ſecond operation, thoſe ridges are thrown into the firſt furrows; and then, the ground has had one ploughing throughout: and ſo on, for three more ſuch ſtirrings. If he conſiders the nature of this mode, how the ſoil is expoſed to the froſts in winter, and the ſcorching heats in ſummer, he may well expect from it the full effect of fallowing: the deſign of which is not only to deſtroy the weeds; but alſo

to introduce into the pores of the ſoil, all the riches of the atmoſphere. For, without that aid, land will be poor indeed; and unable to puſh on vegetables to their maturity, unleſs by forcing with dung; which too often ruins the tone of ſuch exhauſted matrices; that can only be gradually recruited, by the mild and benign principles, treaſured up over our heads, after we have prepared the land for their reception. Let the ſoil be rough in the various fallowings; and the chemical principles of the atmoſphere, will only adhere to the ſurfaces of the larger lumps, whence there can be no fermentation, nor conſequently a proper motion to excite vegetation. Let the ſoil be made fine, in the operations, and the influences of the atmoſphere, by having free admiſſion, will intimately adhere to the finer lumps; and bring on a well-tempered fermentation; ſtill more refine the ſoil; and, by this true biaſs of vegetation, bring the crops to a lovely maturity.

It is very certain, that the atmoſphere imparts to the ſoil, when made properly fine, the ſame nutritive principles as are contained in dung. The truth is, theſe influences of the atmoſphere do not act on the crops, with the ſame violence, as the dunghill; but they are more durable in the execution of their office; and do not injure the mould, which cannot be ſaid of forcing ingredients. To be ſure it is the greateſt miſmanagement, to make the land fine, before we ſow the ſeed, when we are ſenſible the ground is full of weeds, ſince that is the ready way, to deſtroy moſt of the crop. But as we know the cauſe of our calamity, we ſhould take proper methods to remove it; and what theſe are, has been made very evident in two performances, now in the hands of many gentlemen, who find the happy effects. An earneſt deſire, to promote the intereſt of agriculture, and to render the profeſſion of a farmer more comfortable, and leſs hazardous, are the motives of ſending you this letter. And, ſurely, if ever the buſineſs of farming be carried to any deſirable perfection, it muſt be by making and publiſhing experiments, within the power of every ploughman to execute, otherwiſe they are made to no purpoſe. The ſubject of this letter is

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nothing leſs than what has been confirmed by repeated experiments; and, therefore, as it is not the product of fancy, ſome of your readers will, I hope, alter their opinions, and ſet about making an eſſay on an acre, or rood, of land, of what is herein recommended to them to be tried, for a public good, and their own benefit: and thereby effecting the happineſs of thoſe, who bleſs the nation with their endleſs toil, in tilling the ground.

The mode of culture, by this double plough, is but a ſmall part of the ſyſtem of experiments, which I have made: and no doubt other perſons alſo, in the practical parts of huſbandry, may have done the ſame: and then, ſurely, if your readers were to publiſh * ſuch ſolid improvements in your *Muſeum*, there would be leſs room in it for what has only a remote tendency to raiſe the fabric, by the addition of ſuch *minutiæ*. I muſt tell you, though this is the firſt time I ever troubled you, that I have always looked on your undertaking as extremely well adapted to obtain the noble end of carrying agriculture to its utmoſt improvements; which I hope will be the reſtleſs ſtruggle of all your readers: than by doing which no one can better deſerve the name of *Utilium ſagax*, as Horace calls him.

I am, GENTLEMEN,

York, Mar. 29, 1766. Your obedient ſervant,

J. LADNAR.

* As Mr. Ladnar here mentions, "this is but a ſmall part of "the ſyſtem of experiments he has made:" we hope, he will ſet the farther example to others, whom he calls upon to impart, the improvements they make, to the world, by extending the benefit of more of his diſcoveries and obſervations to the public. We ſhall always, on our part, be extremely ready to give them a place in this work: and to be furniſhed with ſo juſt an excuſe, "for excluding thoſe *minutiæ*," which he ſays, "have only a "remote tendency to raiſe the fabric," we attempt to erect. We preſume, and it is apparent to our readers, we have juſt ground for it, that our later numbers have given little reaſon for this remark: but in the firſt attempt to execute ſuch a plan as this, it could not be expected, an adequate correſpondence would be obtained under ſome time, for the ſupplying conſtantly ſuch a quantity of very important matter, as the volume of the work demands, eſpecially as the death of the late Mr. Wych deprived us of a very material promiſed aid. E. O.

NUMBER XXXV.

An Account of the State of a Piece of Ground cultivated with Burnet; and its Effect in feeding Cattle and Horſes: In a Letter from the Kentiſhman.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

MY two acres of burnet, ſeem now to have overcome all the difficulties they had to encounter with; and are in a fine flouriſhing ſtate: except the ſmall wet piece; and that has not totally failed. I had a cow ſtaked upon it laſt ſummer for ſeveral days for a churning. The butter was very good: and I had, ſeveral times laſt month, ſheep and young lambs turned upon it, all of which eat it. Some horſes alſo will eat it: but I have never ſeen one, that eat it * greedily, though I have had a great many tried, and even immediately after they have come from the plough. Several other people, likewiſe, have tried their horſes, who have come to ſee the burnet, when I have been with them, and with the ſame event. However, I intend, as ſoon as it is long enough, to have ſome of it cut, and given to the horſes in the ſtable, in the manner we do clover; and, if they will eat it this way, and if it will come to be fit to cut ſooner, for this purpoſe, than clover, it will be very valuable; and an advantage for every farmer to have ſome of it near his ſtable. Time now will ſoon detetmine this particular point.

I am, GENTLEMEN,

April 7. Your moſt humble ſervant,

The KENTISHMAN.

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* What our correſpondent ſays, of his horſes not being fond of burnet, agrees with ſeveral other accounts of the ſame matter; and ſeem to give reaſon to believe, that horſes in general are leſs inclined to like that herb, than horned cattle are. There ap-

NUMBER XXXVI.

Further Conſiderations on the Practicability of producing Silk in England, *with Advantage to the Undertakers: And on the Means by which that moſt valuable Article may be introduced: In a Letter from* Agricola.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN my former letter to you, on the ſubject of *the practicability of producing ſilk in England*, I gave a ſketch of that ſyſtem of facts and reaſonings on them, which have induced me to believe, that it might be done with great advan-

appears, however, to be a greater variety in the diſpoſition of beaſts, of every kind, to eat or refuſe burnet than any other plant, hitherto cultivated with a view to feeding them: and there is certainly a little myſtery in it, that depends on more than one principle.

It is alledged, on unqueſtionable authority, that, in ſome places, not only neat cattle, and ſheep, but even horſes, are greedily fond of it. In others it is proved, by equal evidence, that ſome of them obſtinately, even to the riſk of ſtarving, refuſe it, and that others can with difficulty be brought to touch it. Again, there are places, where ſome beaſts of the ſame kind ſhow no diſguſt to it; and others either ſeem to have but little reliſh to it, or ſtrongly reject it. In this extraordinary variation, therefore, burnet differs from any kind of plant cultivated for the purpoſe of graſs. It is indeed true of ſeveral other kinds, that particular beaſts, whether cattle, ſheep or horſes, who are not accuſtomed to them, will ſlight or refuſe them, with various degrees of indifference or diſlike, and this is accountable for, from the variety of taſtes and likings we ſee in moſt kinds of animals. But this principle will by no means be ſufficient to account alone for the facts we have mentioned, as obſerved with regard to burnet. If this was the ſole cauſe of the refuſal, it would be only now and then, one beaſt among numbers, that would ſhow the diſlike, while the reſt would be content; and not the whole number together in ſome places, that would ſhow their

advantage to any undertakers, who ſhould manage it with due ſkill and aſſiduity, as well as to the public. I had then ſufficient lights to form a very ſatisfactory opinion of this matter; but the more I inquire into, and conſider about it, the more ſubſequent information and conviction I gain.

With reſpect to the two circumſtances, on which the objections of difficulty, as to this country, are founded; the *coldneſs of the climate*; and *the price of labour*; the following facts have greatly confirmed my belief, that they are erroneouſly urged, as reaſons againſt the profitable introduction of this article.

On enquiring very minutely from perſons well acquainted with this matter, I find, that in all the more ſouthern climates, the worms frequently ſuffer greatly from ſultry heat, eſpecially when attended with moiſture; that they are ſubject to epidemical diſeaſes, on that account, which frequently make ſuch ravage among them, as to deſtroy nearly

their diſpoſition either for or againſt the plant. It is certain this cannot be the effect of chance; but of ſome real local difference in the circumſtances, which determines this in the places, where all eat or all refuſe; and it certainly ought, as we intimated in a former note, to be aſcribed to ſome variation of the qualities of the ſoil, that renders the burnet agreeable, or loathſome, in various degrees, to the cattle. This accounts properly for the extremes of the difference in the beaſts, by ſuppoſing the qualities of the ſoil to vary in proportion. Where we find ſome beaſts chuſing, and others rejecting the plant in the ſame place, we may ſuppoſe the ſoil in a middle ſtate, with reſpect to theſe qualities: and that the other principle of variety of taſtes, and likings in the beaſt, comes in for its ſhare of the effect. By theſe two principles thus co-operating, the myſtery may be unravelled: and we may comprehend how a difference ſo uncommon, and diſſimilar, to the general diſpoſition of beaſts, as to any particular kind of food, happens to be found in this caſe. What the cauſe of this variation of ſoil, admitting the fact, may be, future obſervations will probably bring to light. But the refuſal of cattle to eat it in particular places, is not in the mean time an objection to its being cultivated in any others: and ſhould have no other influence, than to excite a caution to try, in ſmaller quantities of ground, the effect as to this particular, before larger are undertaken. R. E.

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the whole ſtock; that, in temperate weather, they are moſt healthful and exempt from danger; and that, moreover, next to theſe diſeaſes, which ariſe from heat and moiſture, thunder is their greateſt enemy; generally giving them a viſible temporary ſickneſs; and frequently a more continued, ſuch, indeed, as does not ceaſe till it deſtroys them.

Now, if we compare with our own, the climates, where moſt of the ſilk we purchaſe is produced, certainly, in relation to the points, we have above enumerated, inſtead of diſadvantages, we have ſeveral very material circumſtances in our favour; and, by proper management, may avoid the greateſt part of the hazard of loſing the ſilk-worms.

If we have, ever, ſo great heats, they are rare and ſeldom durable; while, in Italy and Greece, on the other hand, they are frequent; nay, even conſtant, in a degree nearly equal to our greateſt. So that as to this exceſs, we have greatly the advantage. If we have, during that ſeaſon in which the ſilk-worms live, more cold weather than is liable to happen in thoſe climates, it admits of a certain remedy, by the means of ſtoves; which, combined with proper ventilators, may be made to afford the moſt genial warmth, attended, at the ſame time, with a conſtant change of air. This will contribute greatly to the health, and vigour of the worms, to which freſh air is particularly beneficial: and the warmth may be regulated by the aſſiſtance of a common thermometer, to a much more accurate degree, even than is required. In this particular, therefore, we have a ſuperiority over the hot countries; ſince, there is always, by the means here pointed out, an effectual and adequate remedy, for too great coldneſs in the weather: whereas, there is no expedient applicable in this view, for producing a greater coolneſs in the places where the worms are to be kept, than is at the ſame time found in the circumambient atmoſphere.

As to the miſchief ariſing from thunder, we are, according to what has happened of late years, peculiarly exempt from it; and they, who are well acquainted with the

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œconomy of ſilk-worms, muſt allow this to be a very material difference in our favour.

The coldneſs, as far as it may affect the ſilk-worms themſelves, is, therefore, no valid objection: but the moſt ſpecious appearance of difficulty, ariſing from the ſtate of our climate, lies in the hazard, that the eggs may, by the variableneſs of our ſpring weather, frequently hatch, and bring to life the ſilk-worms, before the mulberry-trees are in a ſufficient forwardneſs to afford them food. And, indeed, if art could not interpoſe, according to the natural ſtate of things, there would be too much force in this objection. But experience has ſhewn, that the hatching can be retarded by artificial methods: and that, though the manner of it has not been hitherto improved, ſo as to extend to every caſe, where it might be available, yet the principle is ſo ſimple, and of ſuch a nature, as admits of no limitations or variation of circumſtances, where it could not be effectually carried into practice. The ſole reaſon why the eggs hatch at a particular ſeaſon of the year, is, becauſe that ſeaſon is warmer; and, conſequently, wherever there is a privation of that heat, they do not hatch. The heat of an human body, continued a due time, will always bring them to life: and the coolneſs of a cellar, will retard their progreſſion to that ſtate, when the warmth of the atmoſphere, in places where the ſun has acceſs, would make them hatch. This is a ſufficient ſecurity againſt a certain degree of warmth in the weather: but where the coolneſs of vaults fails, that of water, frequently changed, into which the worms, incloſed in a proper phial or bottle, are put, is found to ſucceed: and it would be very eaſy always to render water ſo cold, either by the addition of a ſmall quantity of ice preſerved for that purpoſe, as it is for the table, or even by that of neutral ſalts, diſſolved in the water, to make it reſiſt ſufficiently the greateſt heat of the atmoſphere, ſo as to keep the eggs in a condition, as little tending to come forwards in April, or May, as they were in January or February.

This difficulty being removed, there is nothing different in our climate, from thoſe where moſt ſilk is produced, but what, compared with that of the ſilk countries, throws the balance on our ſide, as to the ſilk-worms themſelves; and as to what regards the mulberry-trees, ſuppoſing us able to retard at will the hatching of the eggs, we ſtill ſtand in a fairer light; for thoſe trees not only flouriſh well, and admit of being propagated from ſets or cuttings, but are more ſecure, as I mentioned in my former letter, of ſupplying their leaves duly after the buds are once opened, than in ſome of the countries, which afford the moſt European ſilk. So that, with reſpect to the propagation, and cultivation of mulberry-trees, or their fitneſs to feeding ſilk-worms, excepting the circumſtances of their coming later into leaf, the inconvenience of which is obviated by the means above mentioned, of keeping back the hatching of the egg, there is not a ſhadow of diſadvantage on our ſide: but on the contrary a manifeſt advantage, in our being exempt from the blighting of the leaves. There is, indeed, one other objection, I had almoſt forgot, which Mr. Pullen, in his book, takes ſome pains to anſwer, though he does not ſeem, intirely, to admit the fact on which it is founded. This is, that the ſilk-worms are ſaid to degenerate in colder countries: and to require to have the breed renewed from hotter. This has been borrowed from ſome French authors, who ſay, that freſh ſilk-worms muſt be had, every four or five years, from hotter countries; and moſt probably took its riſe, from obſervations made, in the earlier time of the attempts, to produce ſilk in France, when not being well ſkilled in the management, the breed grew weaker from being treated in a manner, which gradually injured their health, though it did not deſtroy them. There is not the leaſt reaſon to ſuppoſe any other principle of degeneracy than this: nor is it the practice, at preſent, to renew the breed in this manner in France.

Mr. Pullen appears, however, to ſuppoſe, there is ſomething of this kind liable to happen, from the ſilk-worms not being bred and fed in its natural manner; that

is, in the open air on the trees themſelves: and he propoſes an experiment for the finding out a remedy for this kind of degeneracy, by putting, thoſe which are deſigned to breed, out upon the trees. But a very extenſive field of experience ſhews this notion of ſuch a degeneracy, to be erroneous; though it is on the firſt view ſpecious. The particular ſpecies of moth, from which we obtain the ſilk, is not, as is generally imagined, a native or indigenous animal, of perhaps any of the countries, where the ſilk we have is produced: nor is it found wild in them; unleſs in conſequence of ſome of the moths having eſcaped from the places where they have bred by art. And it would not perhaps even be eaſy, to find the place where they were originally taken; or conſequently to obtain them, by any means in a natural ſtate. There is very good authority for believing they were at firſt diſcovered in ſome part of China, or Tartary, where, perhaps, they are far from abounding; or may be naturally very rare, as is the caſe of many ſpecies of moths. In China, where the production of ſilk by art is moſt antient, the ſilk-worms are, and have indeed always been bred and managed in houſes, from the firſt introduction of them as a ſubject of art, which is a very long period of time: and yet if we may judge by the ſilk produced, the ſilk-worms in that country muſt be in the higheſt ſtate of perfection at preſent. Nor is there, that I can find, the leaſt authentic traces of any place, where the true ſpecies are bred or fed in trees, in order to afford ſilk. There have been ſuch attempts, of which we have ſome account: but good fine ſilk was never produced in that manner, nor perhaps any conſiderable quantity, even of bad, from the true ſilk-worm. There is a coarſer kind of filamentous ſubſtance indeed, which the Chineſe do produce from caterpillars living on trees in the open air: but it is obtained from a very different ſpecies of fly.

Mr. Pullen appears to have made a miſtake with reſpect to this point, from having heard ſome general account of the Chineſe practice of putting the ſilk-worms on the mul-

berry

berry-trees; and not having ſeen the paſſage in Du Halde's hiſtory of China, from whence that account was taken. But this is the reality of what is there related. "The "province of Shangtong (ſays *Du Halde*) yields a parti- "cular ſilk, found in abundance on trees and in fields. "It makes the ſtuff called Kyen-chew. This ſilk is pro- "duced by ſmall inſects, very like caterpillars. They "do not ſhape it into cods, like the ſilk-worms, but in "very long threads, which ſtick to ſmall trees or ſhrubs. "Theſe threads are gathered, and make a coarſer ſilk "than the houſe-worms ſpin. But the worms are wild, "and eat the leaves of other trees, as well as thoſe of the "mulberry. Such as are not acquainted with this ſilk, "would take it for a ruſſet ſtuff, or coarſe drugget.

"There are two ſorts of worms which ſpin this ſilk, "one larger and blacker than ours, called Tſwenkyen; "the other, which is ſmaller, is called Tyankyen. The "cods of the firſt are of a ruſſet grey; thoſe of the latter "more black; and the ſilk has a mixture of theſe two "colours. This ſilk is very thick, never cuts; laſts "long; waſtes like linen; and, when good, will not "ſtain, even with oil. This ſilk is in great vogue among "the Chineſe, and is ſometimes as dear as ſattin, or their "beſt-wrought ſilks. As they are very dextrous in coun- "terfeiting, they make a falſe Kyen-chew of the waſte of "the Chekyan ſilk; by which, without care, one may "be eaſily deceived."

In the extracts which Du Halde has given of an antient author, who has written on the production of ſilk, *&c.* there is this further paſſage reſpecting the ſame filamentous ſubſtance obtained from theſe caterpillars hatched by art in houſes, and put out afterwards on the trees to feed themſelves: "There are *(ſays he)* ſome worms no ſooner "hatched in the houſe, but they are laid on theſe trees "*(meaning a kind juſt mentioned before, obviouſly not a mul-* "*berry-tree,)* where they feed themſelves, and make their "cods. Theſe field ſilk-worms, being more hardy, grow "thicker and longer than the domeſtic ſort: and though

" their work is not ſo good, it is valuable and uſeful, as " may be judged of by what I have ſaid of the ſtuff called " Kyen-chew. Strings for muſical inſtruments are made " of their ſilk; becauſe it is ſtrong, and reſounding.

" Du Halde mentions below, that the field-worms, as " he calls them, will feed on oak-leaves, and produce " their ſilk." It is unqueſtionably evident that theſe animals are intirely a diſtinct kind from ſilk-worms.

If therefore Mr. Pullen had ſeen theſe paſſages in Du Halde, he would have perceived that it is not the ſilk-worm, but a moth of a very different ſpecies, not producing ſilk, but ſome other filamentous ſubſtance that ſerves in China as a ſubſtitute for it, which the Chineſe put out on trees to obtain their product. It would undoubtedly have prevented his conception, that ſilk-worms degenerate from the being out of their natural ſtate: and alſo taken away the ſuppoſed foundation for the queries, which he has put at the end of his treatiſe, on the imagination, that the Chineſe ever treat the ſilk-worms, in any other way, than by keeping them always in houſes, and breeding, feeding, and managing them, much in the ſame manner, as is practiſed in Europe.

If we were indeed to leave particular facts out of queſtion, reſpecting this caſe, and recur to general principles, the ſuppoſition, that animals degenerate, with relation to thoſe qualities which fit them for peculiar human purpoſes, is far from being generally true. For many of thoſe qualities are in no degree ſo prevalent in the natural ſtate of the reſpective animals, as when under the management of art, either exerciſed on the breed, or individuals. We find them, on the contrary, often greatly improved by cultivation: and that a depravity follows the reſtoring the ſubject to its original œconomy. I cannot therefore doubt but that great care to preſerve the health and vigour of the ſilk-worms, and the ſelecting for breeders only ſuch as appear moſt hearty and vigorous, would be an effectual way, to keep the breed of ſilk-worms perfect.

I have been the more explicit on this point: becauſe it is an almoſt general notion among thoſe, who are not ac-

quainted with the hiſtory of this matter, that ſilk-worms are natural to the European and other countries, where ſilk is produced; and that they are really bred and kept for ſpinning on mulberry-trees in the open air. This miſtake ſuggeſts an opinion of the comparative difficulty of their being profitably managed here; and ſo conſequently affords one ſource of diſcouragement which it is very proper to remove, by ſhewing that no one ſingle circumſtance of trouble or expence is requiſite here, except the retarding ſometimes the hatching of the eggs, and the warming the rooms that is not equally ſo in all other places where fine ſilk is produced.

The unwholeſomeneſs and diſagreeable ſmell of ſilk-worms, has been, with equal error, urged as an objection to them. But it is the ſuppoſition of a falſe fact, ariſing from the conſequences of the neglect or ignorance of thoſe who have managed them improperly. For if they be kept duly clean and in health, and the places where they are bred and fed are properly ventilated, neither the animals themſelves, nor the mulberry-leaves, have any *effluvia* or ſmell, that are in the leaſt noxious or offenſive: and experience in hotter countries, where ſuch effects would naturally be aggravated, has ſhewn this notion to be very groundleſs. Whoever produces good ſilk, will have no inconvenience of this kind, from the ſilk-worms: for a remiſſneſs in duly removing what might be diſguſtful, will either ſoon deſtroy the animals; or at leaſt fruſtrate the end of keeping them, by rendering them incapable of affording good ſilk.

I ſhall, now, ſay a few words as to the objection made on account of the price of labour; and the other expences attending ſuch an undertaking, being too great here to admit of its being profitable. What I ſaid in my former letter, concerning whom the perſons are, and what their preſent ſituation is, that are proper to be employed in this work, evinces, that hands might be had for this purpoſe at very reaſonable rates. I ſhall, therefore, only add a matter of fact, for the knowledge of which, I am obliged to a gentleman of great probity and ingenuity, who has reſided

reſided a long time in Greece. It is this: that the hands engaged in that buſineſs generally earn, what is equivalent to *five pounds ſterling*, during the *ſix weeks, or thereabouts*, they are employed in it each ſeaſon. Now, if the additional charge on this five pounds, in commiſſion, merchants profit, freight, duties, *&c.* before the ſilk comes to market here, be added to it, we may well account it ſeven or eight pounds; which would be much more than ſufficient to hire women and children, that are now ſtarving for want of employment.

The making and cultivating a plantation of mulberry-trees is the other conſiderable article of diſburſement: but if we examine what little expence attends this, after the firſt planting of ſuch trees; and how great the return may be proportionably; it will ſhew, inſtead of diſcouragement, the greateſt proſpect of advantage. In France, above fourſcore years ago, when the price of ſilk was greatly lower than at preſent; it appears from a paſſage in Mr. Locke's *Obſervations on the Growth and Culture of Wines, and Olives, and the Production of Silk*, lately printed from the original manuſcript in the poſſeſſion of the preſent earl of Shaftſbury, that the leaves of a moderate mulberry-tree afforded, when ſold for feeding ſilk-worms, above five ſhillings. He ſays, ſpeaking of the ſouth of France, "Their mulberry-trees, where they ſtand near towns, "yield them good profit. I have known the leaves of "*four* white mulberry-trees (ſome whereof were not very "large) *ſold* for a *piſtole*, i. e. *between ſixteen and ſeventeen* "*ſhillings ſterling*." Now if we reflect, that above ſix hundred of theſe trees can grow in an acre of ground; or a proportionable number of ſuch as are leſs; it appears, that the expences in producing ſilk, labour excepted, are extremely ſmall in proportion to the return: indeed, almoſt nothing, after the buildings and utenſils are provided; and the plantattion of mulberries completed.

At the preſent conjuncture, when the price of ſilk is ſo very high, there ſeems nothing wanting to give us the faireſt proſpect of great national advantages, as well moral as

commercial,

commercial, from the eſtabliſhment of undertakings for the domeſtic production of it, than an adequate attention and ſpirit in thoſe whoſe property and leiſure make them fit patrons of ſuch deſigns. The ladies of Great-Britain, in particular, might on this occaſion moſt eminently ſhine in a political capacity; and every individual of them at once diſplay their ingenuity and patriotiſm.

Certainly, they, who ſhould thus, acting in their own proper ſphere, do ſervice to their country, would merit more honour than is due to the publiſhing the moſt elaborate ſpeculations on liberty and the Britiſh conſtitution. Without invading the male character, a lady might, in this way, greatly advance the commercial, now the moſt eſſential intereſts of her country; feed and clothe the neceſſitous poor in her neighbourhood with little expence, and, what is more important, reform their morals, as well as ſupply their wants; provide a comfortable and reputable eſtabliſhment for ſome dependent relation or friend; and obtain, at the ſame time, a moſt rational and agreeable amuſement to herſelf. It is not to be ſuppoſed, that the whole of our great demand for ſilk would be this way anſwered; but, if beginnings were thus made; examples ſet; and demonſtration preſented of the practicability and profit of ſuch undertakings; others would ſoon be induced to engage in it, from lucrative motives; and the very great private benefit, that might reſult, while the preſent very high price of ſilk holds, would, in all probability, occaſion a rapid progreſs of this moſt valuable product.

As an additional incitement, therefore, to ladies, and as an apology, likewiſe, for my addreſſing them ſo particularly on this ſcore, I muſt not omit to mention, that it was a great princeſs, to whom the world owes the invention and introduction of the uſe of ſilk: by which, ſhe relieved the diſtreſs in which her ſubjects were from the want of clothing; furniſhed their poſterity with the means of enriching their country, the moſt populous and extenſive in the world, by the various arts employed in the manfacturing this material; and introduced an article of

great

great utility, as well as luxury, to almoſt all the civilized countries in the world. That the example of this princeſs, who was an empreſs of China, may be more ſtriking, and have greater influence, I beg leave to infert here the account which Du Halde has given us of this diſcovery, from ſome antient Chineſe authors, who have written on the production of ſilk: and whoſe account of the nature, manner of breeding, feeding, and treatment of the ſilk-worms; as well of winding off the cocoons or ſilk balls, in order to the forming what is called raw ſilk; tallies, in ſo extraordinary a manner, with the preſent European practice, as leaves no room to doubt of the authenticity of the book.

" *Greece* made *Italy* the rich preſent of ſilk, which, in " the time of the *Roman* emperors, was valued at its weight " in gold. The *Grecians* were beholden to the *Perſians* " for it; and they, according to authors of moſt credit, " as M. *d'Herbelot* obſerves, confeſs, they had the know- " ledge of ſilk-worms, and the art of breeding them, ori- " ginally from *China*. The moſt antient *Chineſe* writers " aſcribe their diſcovery, to one of the wives of the em- " peror *Whang-ti*, her name *Si-ling*; and ſurnamed, for " honour's ſake, *Ywen-fey*. But it is difficult to meet with " any memoirs of an early date, that mention the ſilk- " worm. Before the time of this queen, when the coun- " try was but newly cleared, the people were clothed in " ſkins of animals; which being inſufficient for ſo multi- " plying a people, neceſſity rendred them induſtrious; " and they exerciſed their invention, in making cloth to " cover themſelves; but they were obliged to this prin- " ceſs, for the uſeful diſcovery of ſilk.

" Since her time, ſeveral empreſſes, recorded in Chineſe " authors, have been agreeably employed in hatching, " and breeding of ſilk-worms; in feeding them; collect- " ing the ſilk; and manufacturing it: and an orchard of " the palace was allotted for a plantation of mulberry- " trees. The empreſs, attended by the emperor's other " wives, and the great ladies of the court, went in cere-

" mony

" mony to this orchard; and gathered, with her own " hands, the leaves of three branches; which her maids " of honour bended down within her reach. The fineſt " pieces, made by herſelf, or by her order, and under " her eye, were devoted to the ceremony of the grand " ſacrifice offered to *Shang-ti*.

" There is reaſon to believe, that the trouble the " empreſſes thus gave themſelves, was chiefly with a politic " view, to engage, by ſuch examples, the princeſſes, the " ladies of quality, and all the people in general, to breed " ſilk-worms: in the ſame manner as the emperors, in " order to ennoble, in ſome degree, agriculture, and ex- " cite the people to ſo laborious an employment, always " obſerve, in the beginning of the ſpring, the ceremony " of holding themſelves the plough, opening with it ſome " furrows, and ſowing grain in them. The preſent em- " peror ſtill keeps up this cuſtom. As for the empreſſes, " they have, for ſome time paſt, not concerned themſelves " about ſilk: though there is yet to be ſeen, within the " verge of the palace, a large ſquare of houſes, where " ſtands the church of the French Jeſuits; the avenues " to which, is ſtill called, *the way to the nurſery of ſilk-* " *worms, for the diverſion of the empreſſes and queens.* In " the books of the antient philoſopher *Mençius*, we meet " with a wiſe regulation of the magiſtracy, which limited " the place appointed for the mulberry plantation, accord- " ing to the extent of every private man's poſſeſſions.

" We may well call *China* the *Silk Country:* for it ſeems " to be inexhauſtible of that commodity. Beſides furniſh- " ing the nations of *Aſia*, and *Europe*, with large quan- " tities, the emperor, the princes, and their domeſtics, " the *mandarins*, the *literati*, the women, and, in ſhort, " the generality of the *Chineſe*, wear ſilk; and are clothed " in ſattin or damaſk. There is ſcarce any excepted, but " the meaneſt of the people, and the peaſants, who wear " blue cotton."

This is the account given by Du Halde, of the very important and meritorious diſcovery, and introduction into

uſe, of ſilk, by a great princeſs, empreſs of the moſt populous and extenſive country in the world. If it would not appear a preſumption, to ſeem to pry into and diſcloſe the private tranſactions of great perſonages, I would enforce the influence of this great example of royal patriotiſm, by the further inſtance of another illuſtrious princeſs, who I have reaſon to believe, is engaged at preſent in the ſame perſuit. From her great and good qualities, ſo eminently obſervable by thoſe, who have the honour and happineſs to be near her perſon, we may juſtly hope, that when ſhe is convinced of the practicability of this matter in the country where ſhe now reigns, ſhe will exert her influence in procuring the ſame advantages to her ſubjects, as the empreſs of China formerly did with ſo much ſucceſs, and glory: and render it in like manner faſhionable for ladies of the firſt rank, to aſſiſt in this great work; to the eſtabliſhment of which, ſuch a patronage only is wanting.

After this addreſs to the ladies in general, I muſt make another to one gentleman in particular, in whoſe power it is to promote this matter, by means, that could not fail of ſucceſs. The gentleman, whom I would exhort to an act ſo beneficial to the public, is the ſame, whom I mentioned, in my former letter, to be poſſeſſed of the Chineſe art of the managing ſilk-worms, with advantages unknown to the Europeans: and whom, I am informed, is returned home. If he be poſſeſſed, as I preſume he is, not only of the ſecret of having ſucceſſive products, as he informed me, in the ſame year, but alſo the manner of producing that kind of ſilk which is *white in its raw ſtate*; it would give incredible advantages to the ſilk trade here. It is in his power, not only from this knowledge, but from certain circumſtances and connections, not proper to be mentioned, to put this deſign immediately into the moſt vigorous motion: and it is on him, therefore, I call for his own honour, and for his own country's ſake, to exert the ability, his ſituation gives him, to accompliſh this momentous purpoſe.

I ſhall for the preſent conclude here: but, that I may not attempt to incite others to undertakings of this momentous

mentous kind, without lending all the aid to them that is in my power, I will, at my leiſure, impart to you what I have collected of the means of breeding, feeding, and managing ſilk-worms, in order to the obtaining from them, the ſilk in the greateſt perfection. The firſt ſtep to this is an adequate plantation of mulberry-trees: and the executing it with the leaſt expence, trouble, and hazard, ſhall be the ſubject of the next letter I write to you, on this article.

I am, GENTLEMEN,

Your very humble ſervant,

London,
March 26, 1766. AGRICOLA.

NUMBER XXXVII.

Inquiry relative to Dr. Hales's *Machine for winnowing Corn.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

SOME years ago, in reading Dr. Hales's Treatiſe on Ventilators, I found a new method of winnowing wheat: which ſeemed ſo great an improvement upon all the other methods I had ſeen, or heard of, that I reſolved to put it in practice, with all convenient ſpeed.

I could eaſily have got the ſieves, *&c.* executed in my neighbourhood: but, Dr. Hales gives no deſcription of one neceſſary part of the *apparatus*, which he calls a circulating fan *, or fagg; from, I ſuppoſe, a preſumption that

* We cannot well underſtand from whence this gentleman's difficulty ariſes with reſpect to what Dr. Hales calls the *circulating fan*. He ſays, he underſtands it to be a common implement of huſbandry, and we conceive the ſame indeed, to be ſo *common*, as to be the only one *commonly* uſed for winnowing corn. Dr. Hales calls it by a name, perhaps not ſo uſual, but yet ſo deſcriptive, as not to be eaſily miſtaken. As this inſtrument is a large

that it was a common implement of huſbandry. This I have, nevertheleſs, not hitherto any where ſeen, nor can obtain any information of from my neighbours, or correſpondents, or by means of any book of huſbandry, though I have conſulted moſt of thoſe wrote in the Engliſh language. I, therefore, gave up all thoughts of the thing, until your work appeared; in which I had ſome hopes of finding the matter occaſionally mentioned. Failing in that, I reſolved to aſk the favour of you, to inſert ſome deſcription of the circulating fan, if not a plate.

Perhaps you may ſay, as in the caſe of Mileſius, that you cannot afford plates of the common implements of huſbandry; and that ſo doing would not anſwer any good end. But, gentlemen, I beg you would conſider duly, what may reaſonably be called common implements in huſbandry. I am ſure, ſuch as are not deſcribed in any book,

cylinder, to which are affixed ſeveral looſe ſheets of ſacking, or coarſe cloth, which, on turning the cylinder, do the office of a fan, or rather of ſo many winnowing fans. This being the caſe, it ſeems needleſs to give any detail deſcription, and much leſs a plate of an implement, which may be ſeen every where amongſt thoſe common kinds, which all farmers muſt be poſſeſſed of. We might have been for this reaſon well excuſed from inſerting F. C.'s letter, or giving any anſwer to it: but as it is an opportunity of imparting ſome very material information, not only to this correſpondent, but alſo all our other readers, who are not particularly acquainted with what paſſes at the London Society for promoting arts, *&c.* we have thought fit to inſert it. The information here meant, is what reſpects a very complete machine for winnowing corn, that is in the collection of the Society, and performs its office with great eaſe and diſpatch; not only ſeparating the duſt and chaff from all the corn, but alſo the light and bad corn from the ſound. It takes up very little room, and is wrought with very little labour: effecting the intended purpoſe with great diſpatch and convenience. This machine is made by ———— at Swillington in Yorkſhire; in which neighbourhood, as well as in ſeveral other parts of the north, it is much in uſe. Mr.———— has alſo lately invented a *machine for thraſhing corn*, which may be moved by the force of horſes, or water, and diſpatches very great quantities in a ſmall ſpace of time. It is now under conſideration, in the Society for promoting arts, *&c.* E. O.

and

and may be confined in their uſe to a circuit of ſixty or ſeventy miles, cannot be conſidered as ſuch; compared with the circulation of your work. And I am humbly of opinion, that a deſcription of the leſs common implements of agriculture, eſpecially when called for by your correſpondents, would be greatly more uſeful to the public, and profitable to yourſelves or bookſellers, than the verbal altercations and ſcoldings of your correſpondents, or the filling up your paper with Mr. Hall's old Eſſay, when an extract from Evelyn, Cook, or Miller, would have been of much greater ſignificance to your readers. I hope, gentlemen, you will be pleaſed to forgive this trouble and freedom from

Your conſtant reader,

and ſincere well-wiſher to your work,

F. C.

P. S. You ſometimes allow your correſpondents to mention new treatiſes on agriculture. May I mention Mr. Dickſon's treatiſe on that ſubject (of which a new edition, with additions and amendments, has been lately publiſhed) as, in my judgment, one of the beſt things that has been publiſhed upon ploughs——and ploughing, the moſt important operation in agriculture?

NUMBER XXXVIII.

Observations on the Culture of Burnet, and its Utility in feeding neat Cattle, Horses, and Sheep, demonstrated from facts: In a Letter from Christopher Baldwin *Esq; to Dr.* Templeman, *Secretary of the Society for promoting Arts, &c. Published at the Desire of the Society.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

THOUGH I was unwilling to have my name appear in a daily paper, yet I am very ready to authenticate * the incloſed letter, in your very uſeful repoſitory. I ſhall mow the four-acre field when in bloom for hay; and, if any thing further ſhould occur in my experiments on burnet, I ſhall be very ready to communicate it to you, with the ſtricteſt impartiality.

I am, GENTLEMEN,

Clapham Common, April 12, 1766. Your moſt humble ſervant, CHRISTOPHER BALDWIN.

* We are greatly obliged to Mr. Baldwin for his intereſting letter, and the honour he does us, in the liberty he allows of authenticating it, by his own proper name. We wiſh this example might be followed by other gentlemen of conſiderable fortune; and diſtinguiſhed abilities in the ſtudy of agriculture. For though we think, it very proper to receive communications of anonymous correſpondents, who favour us with them, if it be their pleaſure to be concealed; yet, in important matters, eſpecially where the facts are extraordinary, vouchers of known credit, certainly conduce to render the influence and effects of the accounts much greater. Moreover, the advantage we hope to procure to the public, by our work, is generally promoted by this means. For we are ſatisfied, that ſeveral gentlemen would, with more readineſs, impart to us their obſervations, if the notion of ſingularity in ſending their names did not in ſome degree prevent them: which difficulty would ſoon vaniſh, if gentlemen of Mr. Baldwin's pretenſions, ſet the frequent example for a ſhort time. A. T. E. R.

A Letter

A Letter from Chriſtopher Baldwin, *Eſq*; *to Dr.* Templeman, *Secretary to the Society for the Encouragement of Arts*, &c. *Publiſhed at the Requeſt of the Society.*

IN compliance with the advice and deſire of ſeveral gentlemen of my acquaintance, I have determined at laſt to ſend you the incloſed certificate of my burnet.

The fields contained by meaſurement ſeventeen acres, though I have only called the quantity ſixteen acres, and I ſhall be well pleaſed to find myſelf excluded by more deſerving claimants; for I thought that the Society propoſed their premiums as a *ſtimulus* for the farmers; but a worthy member of your Society told me a few days ago, that they had little hopes of moving the mere Farmer to attempt experiments of this ſort, but hoped, however, that gentlemen might be induced to do it from offered premiums of the Society, and that when they did, the neighbouring farmers, who could look over the hedge, would ſoon adopt in more general practice the experiments made by the gentlemen, when they ſaw the ſucceſs that attended them.

Whether my friend's reaſoning is right, or not, I cannot pretend to determine; however, I ſhall not content myſelf with merely ſending you the incloſed cirtificate; on the contrary, I ſhall endeavour to give you ſuch an account of the *culture* and *uſes* of burnet, as, I believe, will give pleaſure to the Society, if you think proper to lay it before them.

In the years 1763 and 1764, I made ſeveral experiments on burnet, with a view to make myſelf acquainted with its manner of vegetating, and the uſes to which it might be applied: and having by this means acquired that knowledge I was deſirous of attaining, I determined laſt year to lay down ſeveral acres with burnet; nor would I content myſelf with doing it in any *one* particular method: therefore, in the beginning of July, 1764, I ſowed about eight rods of ground with five pounds of Rocque's burnet ſeed. Rain falling ſoon after the ſeed was ſown, the plants came

up

up very finely, and throve in ſuch a manner, that I was tempted to plough up about an acre of ground and plant it that autumn, in order to ſee what effect the winter would have on the young plants. Accordingly, on the fourth of October, I planted them in rows, about twenty inches apart, and about fifteen inches from each other in the rows. This diſtance, from experiments and obſervations which I have made, ſeems to me to be a very proper one. Theſe plants took very well, and through the winter throve with ſurpriſing vigour. Laſt ſpring I ploughed the remainder of the field, being three acres, and planted it in the ſame manner with my plants, the whole of which, notwithſtanding the * uncommon drought of laſt ſummer, grew well, and the verdure of the plants was really very beautiful. No water was uſed; indeed it would have been a vaſt work in a field of that ſize: however, I never ſaw any need of it. The plants were once hoed, and ſtood over for ſeed, of which the quantity collected was not very great; but this muſt be attributed to the uncommon drought, for I think we had not above one ſhower of rain from the planting to the gathering of the ſeed, the whole of which amounted to about one hundred and ſixty pounds.

The ſeed being got, I was impatient to ſee how the cattle would take to it, as it was roundly aſſerted by ſome gentlemen, that *no cattle* would eat it. Accordingly I ordered four cows and two horſes to be turned into the field; the cows fed freely upon it, but the horſes did not ſeem to like it ſo much at firſt, though in two or three days they

* This fact of burnet's thriving well after tranſplantation, without rain or manual watering, is very extraordinary, and demonſtrates the great utility this plant may be of in dry ſoils, where ſcarcely any kind of graſs, or ſubſtitute for it, can be made to thrive. If we take this into conſideration, along with another circumſtance, which is, that it will grow in poor, as well as dry land, we muſt allow that it promiſes extremely great advantages. In order to aſcertain the degree of this property of growing on poor land, the Society for promoting arts, have this year renewed their premiums, but confined very judiciouſly, to ſuch as is cultivated in the worſt reputed land, in each reſpective neighbourhood. R.

fed well upon it. Burnet has ſtrongly the taſte of cucumber, and I was fearful it might give a diſagreeable taſte to the milk; it therefore gave me great pleaſure to find, in about four or five days, that the quantity of milk was not only much encreaſed, but the flavour of the cream much ſuperior to any I had ever had before, or ever taſted from cows fed upon the richeſt meadows. The cows and horſes having fed down the field, it was hoed again, and then harrowed once over: which laid it very clean: nor could I find, that the burnet was at all hurt by the harrows.

Here let me obſerve to you, that I fed my horſes in the ſtable for about five weeks with the burnet ſtraw, or rather haulm, from which the ſeed had been thraſhed. Theſe horſes fed very freely, and throve much upon it, though they had only half their uſual allowance of oats. However, as I would by no means ſuppreſs any circumſtance that may appear unfavourable to burnet, ſo I muſt tell you, that I obſerved, when any friend called upon me, and their horſes were put into the ſtable, ſome of them eat very greedily of it, and others * would not touch it. I cannot ſay this gave me much concern. I ſatisfied myſelf with thinking, that ſome horſes did not know what was

* This agrees with what, we have obſerved above, in the notes on the Kentiſhman's letter in this number, page 240, that horſes are leſs generally diſpoſed to eat burnet, than neat cattle: and, conſequently, that in thoſe places where the peculiarity of the ſoil, renders the burnet leſs agreeable to beaſts in general, it is not to be wondered at horſes ſhew a more extraordinary averſion. That there are ſuch places, where the burnet is diſagreeable in different degrees to beaſts, is evident from unqueſtionable facts, and to what principle of difference it is owing, is extremely well worth inquiry. We ſhould be obliged, therefore, to gentlemen, to whom inſtances of the diſreliſh of beaſts to burnet may occur in any ſingular manner, to communicate their obſervations to us, as well with reſpect to the ſtate and appearances of the burnet itſelf, as the nature, qualities, and appearances of the land on which it grew, in order to aſcertain, if poſſible, the cauſe of this difference, that, either a remedy for it may be attempted, or at leaſt the public may be furniſhed with the means of diſtinguiſhing, in what places the cultivation of this plant would not be profitable. A. O.

good for them; or, to ſpeak more ſeriouſly, I thought the novelty of the food might as much diſpleaſe one horſe as it pleaſed another; and Dr. Templeman knows, that there are ſome things which we loath as children, we are fond of as men; and that there are ſome things which we as much diſlike as men that are very wholeſome food. But to come nearer to the point; it is well known ſome ſheep and cows will not touch a turnep: yet is any one weak enough to infer from thence, that turneps are an unwholeſome or improper food for cattle? and I was lately told, by a particular friend, that he had often obſerved, when his horſes had fed for ſome time on ſaintfoin hay, it was ſome days before they would again take to meadow hay.—I ſhould not have mentioned this circumſtance of the horſes, but to ſhew my impartiality; and I do it the more readily, as I find there are ſome gentlemen who are as fond of decrying, as others can be of promoting, uſeful experiments in agriculture.

Being well pleaſed with the ſucceſs that had attended my firſt experiment in this field, which I call four acres, I determined to proceed as I had intended in the ſpring of the year. Accordingly, as ſoon as the oats were got off a field of twelve acres, I ordered it to be ploughed and ſown with one hundred and ſixty pounds of burnet-ſeed before mentioned. This field was ſown the twenty-ſixth of Auguſt laſt; and no rain falling till the eighteenth of September, the plants did not appear till the twenty-eighth of that month. However, there ſeems to be a good crop: and I intend, as ſoon as they freſh up in the ſpring, to have the plants ſet out with ſmall hoes (ſuch as are uſed for carrots and onions) to about ſix inches apart: and in about a week after this is done, I ſhall harrow it with light harrows. For from experiments which I have made, this ſeems to me to be the beſt method of managing broad-caſt burnet. Having nothing farther to ſay in regard to this twelve acres, I muſt return to the four-acre field tranſplanted, which having been hoed and harrowed, as before mentioned, was laid up for winter-feed for my cows: but finding lately ſome gentle-

gentlemen had again aſſerted, that ſheep in particular would ſooner feed on the quick-hedges than touch the burnet, I ſent to a neighbouring farmer for his flock of ſheep, and having a friend with me, we followed the ſheep into the field, who fell upon the burnet ſo greedily, that we found it very neceſſary to ſend them home again.

Being much vexed at theſe idle tales told about ſo much to the prejudice of this (as it appears to me) excellent plant, I determined to put it to as fair a trial as I poſſibly could. Accordingly, I ordered in four cows, which were in very good feed on natural graſs, and had beſides a large truſs of oat-ſtraw put in their cribs every night, notwithſtanding which they gave very little milk, and indeed, were almoſt dry. Theſe cows, I declare, had not been in the burnet above ſix days, before they gave much more than double the quantity of milk, nay, was I to ſay three times the quantity, I know, I ſhould not exceed the truth. The milk is exceeding fine, and free from all bad taſte; and farther I muſt obſerve, that they ſoon began to leave half their ſtraw in the cribs; ſo that they are now ſerved with only half the quantity they had before. My land is poor dry up-land gravel, there are millions of acres in this kingdom of better land that do not fetch two ſhillings and ſixpence an acre. What a ſcope therefore is here for improvement! nay, I cannot but obſerve with amazement, the great numbers of country gentlemen who daily flock to this great city in purſuit of trifles, when they have ſuch inexhauſtible funds of knowledge within themſelves, if they would properly make uſe of them.

As the account I have now given you of my burnet, may appear a little extraordinary to ſome of the worthy members of your Society, ſo I ſhall be far from being diſpleaſed at their even doubting what I have now ſaid. On the contrary, it will give me pleaſure, provided any gentleman, who has ſuch doubts, will do me the favour to call at my houſe, and convince himſelf by ocular demonſtration of what I have now ſaid. I am, GENTLEMEN,

Clapham Common, Your moſt obedient humble ſervant,

Jan. 6. CHRISTOPHER BALDWIN.

NUMBER XXXIX.

Observations on a common Error, or Colluſion, practiſed with reſpect to the Form of Meaſures, by which Corn, Coals, &c. are ſold, to the Detriment of the retail Purchaſers of thoſe Commodities; with a Propoſal for preventing it, by providing a juſt Standard of Regulations, proper to be inforced, as to the relative Dimenſions of the Diameter and Depth of ſuch Meaſures.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I Some time ago, met, by accident in travelling, with an ingenious gentleman, who furniſhed me with the hints of the obſervations I have here ſent you, on what may ſometimes be an error; but I am afraid more frequently a fraud, in the conſtruction of meaſures of that kind, where heap, and not ſtrike meaſure, is the cuſtom. I was much affected with the ſubject of them: and thought it a great matter of regret, that no remedy ſhould be applied to a public evil ſo generally practiſed, as the deluſive form of theſe meaſures; and, at the ſame time, as I apprehended, ſo eaſily to be reformed by the ſame interpoſition of the authority of the magiſtrates, as is exerted in other ſimilar caſes: I mean, reformed to a certain material degree; becauſe, tho' the preſent execution of the laws, reſpecting falſe weights and meaſures, does not abſolutely prevent all frauds of that kind; yet it keeps them greatly under. Senſible, that in general, according to the common proverb, what is every body's buſineſs is nobody's; and that this enormity muſt prevail always, if no beginning of an attempt be made by ſome private perſon to bring about this reformation, I was deſirous myſelf to endeavour to excite the public attention to the redreſs of it; and either to procure the execution of ſome law already ſubſiſting that would reach this tranſgreſſion, if ſuch law there be; or the inſtitution

of

of ſome new one, that would ſpecially and adequately make a due proviſion againſt it. But, on reflexion, I found ſomewhat was previouſly neceſſary to be done, in order to enable thoſe, before whom this matter might come, either in a legiſlative or judicative light, to enact or decide equally and equitably as to particular caſes. For, though the fraud is obvious, when in the extreme, even to the obſervation of the ſenſes; yet, when in a leſs flagrant degree, a difficulty would ariſe, of the proper limits to be ſet, in order to determine what is preciſely right, and what is criminally wrong. This conſideration evidently indicated, that there was wanting ſome ſtandard, which might be applicable to every caſe; and become the guide, as well of the makers or uſers of the meaſures, as of thoſe who were to ſettle or judge of the fairneſs of them. The means of eſtabliſhing a proper ſtandard for this purpoſe, ſeemed to be the forming a plan of proportions of the reſpective width and depth of the meaſures, of each denomination, founded on that of ſome known meaſure, and eſtabliſhed by law for the ſame uſes. In conſequence of this apprehenſion, I publiſhed a letter in the St. James's Chronicle, to try by that means to obtain ſuch a plan of proportions adjuſted by the Wincheſter meaſure and coal buſhel, both which are ſettled by acts of parliament, from the ingenious perſon above mentioned, whom I believed, by the manner he explained himſelf in our converſation on this topic, to be very capable of ſupplying me with it; or, if he ſhould not chuſe the taſk, from any other public-ſpirited perſon, qualified to gratify me in this point. The letter was as follows:

"There are thouſands of poor families in and about London, and other large towns, that buy their coals and other neceſſaries in no larger quantities than by the buſhel, half-buſhel, peck, half-peck, &c. yet tho' theſe ſeveral meaſures, upon a nice enquiry, may each hold their proper quantity, in ſtrike meaſure; yet if the depth and diameter be not properly regulated, the purchaſer may be, and nine times in ten

is,

is, greatly injured thereby, in all commodities where the goods, whether coals, roots, ſhell-fiſh, fruit, or whatever commodity ſold, is to be heaped, or crowned above the meaſure. For inſtance: Suppoſe one buſhel to be made eighteen inches and an half diameter, and eight inches deep, which is the dimenſions of the lawful Wincheſter buſhel; and another of fifteen inches diameter, and about twelve inches deep; two buſhels thus made may, for ought I know, contain exactly the ſame quantity ſtruck meaſure: but certainly he, who purchaſes crowned, or heaped meaſure, will be a great ſufferer, if he be ſerved from the buſhel of fifteen inches diameter; and ſo in proportion to all ſmaller meaſures, as it is clear more coals, fruit, &c. will lie on a ſpace of eighteen inches and a half diametre, than on fifteen.

"Trifling as this matter may ſeem at firſt view, it is of ſome importance, and I could wiſh ſome perſon, who is able to improve the hint, would aſcertain the proper depth, diametre, &c. of all meaſures, from the buſhel to the pint, ſo as to make them ſimilar in ſhape, and proportionable to the lawful Wincheſter, and coal buſhels, which might be done by a copper-plate and a few obſervations. This plate might, as it ought, be hung in ſome public place in every town in England, for the information of the poor, and the juſtification of the magiſtrates to puniſh thoſe who preſumed to ſell by meaſures of any other conſtruction.

"I am willing to believe that many people are innocently guilty of this fraud; and I am not without hopes, that a moſt ingenious fellow traveller, who furniſhed me with the above hints, will be as willing as he is able, to ſtate the matter accurately by an explanatory copper-plate, ſhould this, my only method of addreſſing him, come to his ſight."

The reſult of this letter was, that the gentleman above mentioned, did readily favour the public and me, with undertaking to make the deſired plan of proportions; and has ordered it to be engraved on a copper-plate, in order to its being publiſhed. To render the benefit of it more extenſive, and to reimburſe him in the expence of engraving, &c. I think

I think it would be very proper a ſubſcription ſhould be ſet on foot, and I have deſired him in that view to leave the plate with Mr. Davis, bookſeller, the corner of Sackville-ſtreet, in Piccadilly, who will receive the names of ſuch gentlemen as are deſirous of ſubſcribing, and when printed off, deliver the prints on the payment of half a crown. I wiſh, in order to promote this matter, you would inſert this, and the former letter before publiſhed in the St. James's Chronicle, in your *Muſeum Ruſticum*; as it will then be peruſed by many who have it in their power to make a due uſe of it; and the memory of this matter preſerved for ſome proper future occaſion, if it ſhould accidentally meet with neglect now. As this is very conſiſtent with your work, I make no doubt but you will readily give it a place; and, in ſo doing, I think you will ſerve the public, and I am ſure you will oblige me, who am,

GENTLEMEN,
Yours, &c. &c.
A PLEBEIAN.

P. S. Since I wrote the above, I have ſeen, at Mr. Davis's, Bookſeller, in Sackville-ſtreet, the engraver's copy, of the plate now engraving, of the plan of the proportions of the meaſures, with explanatory notes, &c. What, moreover, gave me an additional pleaſure in the information I then gained, was, that I find my fellow traveller has been prevailed upon to publiſh this plate with his name, by which the public as well as myſelf (and the poor in particular) may know to whom they are indebted for this one inſtance at leaſt, "That all men's heads, which are clear, "are not without hearts that feel for the woes of others." The perſon, I mean, who is the worthy deſigner of this plan, is, Griffith Davies, Eſq; collector of the cuſtoms at Harwich; and the conſtructor, of thoſe commodious ſalt-water baths, at that town: to which (according to Dr. Lucas's account) none can be compared; and by whoſe ingenuity and public ſpirit, even the town of Harwich itſelf has, within a few years, been ſo improved, that from

from being merely a place of paſſage, it is now become the reſort of many people, every ſummer, of the firſt rank and diſtinction.

NUMBER XL.

A Letter from Mr. Wynne Baker, *reſpecting ſome Inquiries relative to Rape-ſeed, Cole-ſeed, and Millet; and a Propoſal for eſtabliſhing a general Correſpondence betwixt the ſeveral Societies for promoting Agriculture, for the tranſmitting to each other uſeful and rare Seeds and Plants.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I Received the incloſed letter yeſterday. In a letter of mine to you, on the 7th of May, 1765, I incloſed you a letter from the ſame gentleman, which you were ſo kind as to inſert in your 4th vol. p. 397. I then informed you, he is a perſon of conſideration in this country, and a conſtant reader of your work. I may now add, that his conſtant attention to the ſervice of his country, (in which he pays no ſmall regard to agriculture,) both in his public and private character, procures him the ſteady affection of the people: and therefore I wiſh ſome of your kind correſpondents would anſwer his enquiries, which I ſhould eſteem a favour done to me; and, for that purpoſe, you will oblige me, by inſerting his letter in your collection as ſoon as may be convenient to you.

Your correſpondent G. B. in his P. S. p. 157, Vol. V. has promiſed to give us "a * full account of the feeding "beaſts

* Application has been made by us to a gentleman, who has very great concerns in the making linſeed and rape oil; and is, at the ſame time, an able farmer; to give us the moſt ſatisfactory account of the beſt manner, and the effects of feeding cattle with the cakes of the linſeed. In compliance with Mr. Baker's requeſt, we

"beasts with linseed cakes." I presume rape cakes are also used in the same way? I shall be very thankful to this gentleman, if he will indulge us with this account as soon as he conveniently can.

I have, gentlemen, taken some pains in trying to procure a little millet, in order to sow in this country; as I do apprehend, if the culture of it could be generally introduced, it would be a great relief to the poor: but all my endeavours have hitherto proved ineffectual. In your 5th vol. p. 74. I find a letter from Mr. Burton, upon the subject of African millet, abstracted from the transactions of the Berne Society.

The world is already much indebted to some ingenious gentlemen farmers of Switzerland, for their unwearied persuits of agriculture; and I could not but feel myself obliged to Mr. Burton, for furnishing us with so useful an hint, from such authority. It has raised in me, a great desire to obtain some of this African millet, as well as the other sorts, particularly the yellow; as that, which is sold by the grocers, will not grow. If you, or any of your correspondents, can assist * me in this particular, I shall most chearfully make full recompence, over and above the acknowledging myself much obliged. I am strongly per-

we shall press him for a speedy performance of his promise; and will insert it, the first opportunity after we receive it. In the mean time, we can inform Mr. Baker, that cattle are not fed with rape cakes, because they refuse to eat them: and those cakes are therefore sold for manuring the ground. This is true of the rape cakes in general, but I have heard it asserted, that in Lincolnshire the cattle have eaten them. This difference may be owing to the difference of the cakes; because both cole-seed and rape-seed being used for extracting the oil, it is possible the general disgust may be only to one: and that the other, when wholly free from it, may be liked by some cattle; and, as they are frequently mixt, this may account for the seeming contradiction. E. O.

* We shall, with great readiness, endeavour to procure what Mr. Baker desires; as well on his own account, as to promote a very laudable examination into a subject of great importance; as we must esteem every attempt to relieve the wants of the poor of any country, by the discovery of cheap provisions. R.

ſuaded, that millet would anſwer wonderfully well in the drill culture.

I have long intended, gentlemen, by the channel of your work, to propoſe a ſcheme to the public, for a mutual intercourſe and correſpondence between the nations, which now ſeem engaged in the cauſe of agriculture, for the tranſporting to each other, the ſeeds of ſuch ſcarce and valuable plants as are, or might be, diſcovered: by which means, the * *Muſeum Ruſticum* would become a general channel of intelligence; and the uſeful ſeeds and grain would be much ſooner tranſported from nation to nation, than they can be by the endeavours of a few individuals who labour theſe points. And I ſhould conceive, the moſt effectual way of accompliſhing a ſcheme of this kind, would be for the ſocieties now eſtabliſhed in many nations for promoting agriculture, to be the repoſitories for ſuch grain and ſeeds. I am perſuaded every ſociety, now eſtabliſhed, would cheerfully contribute their aid; and I can almoſt take upon me to ſay for that of Dublin, that they will lend their's in ſo good a work: as their principles of motion, are not actuated by national views; but the general good of mankind is the life and ſpring of their actions. I have not yet had time to digeſt and lay this ſcheme before them, but I will prepare it as ſoon as I can. In the mean time, if I find this looſe hint ſhall meet with the approbation of you and your correſpondents, I ſhall draw out a liſt of ſuch articles as I believe would be uſeful, but have not yet been able to obtain, altho' I am continually procuring letters to be ſent

* Whenever Mr. Baker will favour us with the particulars of his plan, we ſhall be extremely ready by all means, that come within the intention of our concern in this work, to promote it to the utmoſt of our abilities. We are extremely ſenſible, that ſuch an intercourſe, not only betwixt the ſocieties for the promoting agriculture in Europe, but between them and thoſe in America, of which there are now ſeveral; would have a great tendency to the introduction of many great improvements. But how far ſuch an eſtabliſhment may be practicable, we ſhall ſuſpend our opinion, till Mr. Baker has more explicitly opened his notions to us, to which we ſhall give great attention. R.

to

to many parts of the world. Objects, which appear to be inferior to those which engaged the attention of mariners and merchants, are generally neglected; and when a ship returns, it is the easiest thing imaginable for a man to say, I forgot it, I lost it, or it could not be had. I am tired out with these excuses, and am losing one year after another, without any prospect of success. And therefore, in the name of the public, I now call upon you, and your kind correspondents, to lend your aid, in rousing mankind to an attention to this object, which I really think an important one.

I am, GENTLEMEN,

Your most obedient humble servant,

Dublin,
March 30, 1766. JOHN-WYNNE BAKER.

DEAR SIR,

A MODERN writer upon husbandry in this kingdom, I mean the ingenious Mr. Charles Varley, has pointed out a distinction between cole-seed and rape-seed, which, I confess, I had never before been informed of.

The cole-seed, according to him, is a * species of cabbage, brought originally from Holland, and, in a proper soil, is productive of more seed than the rape. The rape plant, in my apprehension, is a species of wild turnep, and, therefore, differs extremely from the other. I have met

* Mr. Varley is certainly right in asserting, that the cole-seed and rape-seed, are very distinct species of plants; and that, the cole-seed is of the cabbage tribe. It is equally true, that the rape is a wild turnep, and that they have no affinity, but what is general to those two families of plants. The cole-seed is of much later introduction here, and most probably was brought first from Holland or Flanders, where it has been long cultivated for making oil: though it is, most likely, a native species of the more eastern parts of Germany, where several others, of a similar kind, are found. R.

with a third ſort of ſeed-bearing plant, nearly allied to theſe kinds; which is common in Burgundy, and ſome parts of Flanders. The people there call it, I think, *navette*, and aſſert, that it produces more ſeed, and an oil ſo far ſuperior to rape oil, as to be often eaten inſtead of olive oil. A gentleman of my acquaintance has brought ſome of this laſt ſeed into this kingdom, and it thrives exceedingly well with him.

Mr. Varley ſays, that the fenny countries of Lincolnſhire, Yorkſhire, *&c.* are the moſt famous places for cole-ſeed and rape-ſeed: it would be a ſervice to the public, if ſome gentlemen of thoſe counties, would explain particularly the difference between theſe kind of plants, and which of them may be moſt * advantageous for the farmer.

Such a perſon, perhaps, might be alſo induced to ſet out particularly the † uſes, to which the rape-oil cakes are applied for the feeding of cattle: an information which, I ſolicited, though hitherto in vain, in the *Muſeum Ruſticum* of Volume IV. page 397.

I have alſo reaſon to apprehend, that, ſince a ſcarcity of corn has prevailed in this kingdom, ſome diſtillers have been induced to draw a ſpirit from theſe rape-cakes, and have found it turn out very much to their advantage. This at

* There are two kinds of turneps, according to the older notions of diſtinction, the *Rapa* and the *Napus*: and there are wild ſpecies of both kinds. The common rape-ſeed, is a wild ſpecies of the ſecond kind, called in authors *Bunias*, and *Napus ſylveſtris*, or *wild navew*; which affords a ſweeter oil, than either the wild rape, or the cole-ſeed. This is the true *navette*: but Lemery ſays, that the ſeed of the *colſa*, or cole-ſeed, is the kind, commonly called *navette*, by thoſe who uſe it for making oil. We are apt to believe, therefore, the ſuppoſed third kind, which this gentleman ſays, has been lately ſhewn, and newly introduced, is, in fact, the cole-ſeed: and, that the other kinds, if he had ſeen two, before in Ireland, were the wild rape, or charlock, and wild navew, or burnias, which have both been uſed for making oil; and are frequently confounded under the name of rape-ſeed. E.

† The cole-ſeed, is cultivated in ſome of the places, mentioned by this gentleman, for two very different purpoſes, the ma-

at leaſt is a matter, that deſerves the attention, and inveſtigation of the learned.

I know an ingenious poor man in my neighbourhood, who has invented a method of refining theſe oils, at the moſt trifling expence, ſo as to make them anſwer for all the purpoſes of the woollen manufacture, equally to the beſt imported olive-oil. I believe the public might for a trifle purchaſe this ſecret from him; and I have no doubt, it would be of national advantage, to have it univerſally communicated. So far as you think theſe hints may be properly inſerted in the *Muſeum Ruſticum*, I beg you will communicate them to the proprietors of that work.

I am, SIR,

Friday Morning, March 28, 1766.

Your moſt faithful, and obedient humble ſervant.

making oil, and feeding cattle only. But originally it was introduced there, probably, in imitation of a Dutch and Flemiſh practice, for making oil only: and was ſown in common with rape-ſeed, or, more properly, wild navew-ſeed, when there was danger of a bad ſeaſon, that might make the rape fail. For, being extremely hardy, the cole-ſeed would reſiſt weather, deſtructive to the other.

This hardineſs recommended it to the attention of the farmers: who finding it a good ſecurity againſt want in hard winters, where other paſturage might fail, and fodder be very dear, they cultivated it for ſolely feeding cattle; and this practice has now ſpread over ſeveral counties. It is our intention, when we are furniſhed with the information mentioned above in the note on Mr. Baker's letter, to give a full account of the culture, and particular uſes, of the cole-ſeed for both theſe purpoſes. But we apprehend the cole-ſeed, is ſo much of the nature of bore-cole, that the manner of cultivation muſt be greatly the ſame: and that the knowledge of the comparative advantages is more a point to be inquired into, than how they may be differently managed. E. O.

NUMBER XLI.

Some Obſervations on the Point of View to which the Editors have reduced their Inquiry into the Reaſon of the Liking or Diſguſt which Cattle ſhew to Burnet: with an Account of an Experiment relative to the ſame; and ſome Reflexions on the Miſchief done by Labourers carrying up Ladders Materials for Building, and a Propoſal for applying an adequate Remedy.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I Heartily *aſſent to*, and *approve*, your reducing the point of inquiry, now remaining, about Mr. *Rocque*'s burnet to this, *viz.* in what ſoils it can be *advantageouſly* cultivated? "For as it is (to uſe your own words) beyond all doubt, at "preſent, that there are inſtances of particular places, "where the beaſts obſtinately refuſe to eat burnet, and "of others, where, though they do not *wholly* reject it, "they yet ſhew they have ſome diſlike to it;" ſo, I have always had more candour than to doubt, that there are places where beaſts not only *eat*, but like it.

Again, you moſt juſtly aſſert, that this liking and diſliking cannot be owing to a mixture of Mr. *Rocque*'s original ſeeds; for though there might be a *ſeminal variety*, yet, "it being *certain* that the cattle fed promiſcuouſly on "what Mr. *Rocque* raiſed from this ſeed, and that where "parcels of it have been divided and ſown in different "places, the cattle eat what was raiſed in one of theſe "places, and refuſed what was raiſed in others; it can be "aſcribed only to the *effects* which different ſoils have on "this plant." See note *, p. 27 of preſent vol.

This judicious ground-work of yours, gentlemen, is ſufficient to anſwer fully the *hypotheſis* advanced by ſeveral, to account for the diſlike which ſurprized many of us.

Mago need no longer inſiſt on the ſuppoſition, that fig. 2, and 3. in Plate 1. of your Vol. V. repreſent two ſorts of Mr. *Rocque*'s burnet; and that fig. 2. is the *green* or *moſt-graſſy*, and fig. 3. the *moſt-ſtalky*, as he expreſſes himſelf, p. 30 of this volume: for you have ſhewn him, that cattle eat promiſcuouſly what Mr. *Rocque* raiſed; and, as to his inclination to think, that I ſhall find, that what is called my burnet, is the ſame as fig. 2. if he will pleaſe to look upon the ſpecimen I ſent you, his eyes will convince him, that he has no ſort of grounds for it.

In agreement, gentlemen, with the important point, to which you have judiciouſly reduced our inquiries about burnet; I propoſe to give you an account, with my firſt leiſure, how burnet, which grows on a rich flower border, is reliſhed by cattle. Mr. *Cooke*'s ſoil is a *coldiſh*, and lightiſh gravel, and mine a warm gravel mixed with loam; and from neither of theſe has a burnet aroſe, which our cattle would eat.

Fully perſuaded, gentlemen, that you had reduced the inquiry, as to the liking or diſguſt of cattle to burnet, to the right point, I ſet about the experiment this morning, which, I ſuppoſed, would confirm your theory. Having a little burnet raiſed from the ſecond generation from Mr. *Rocque*'s ſeed, and growing in a *rich garden* border for flowers, I apprehended it might be more agreeable, on account of the ſoil, to cattle, than what had grown on a warm gravel mixed with loam. I accordingly gathered a good handful, and waſhed it well in fair water, that no accidental impurity might diſguſt the beaſt to which I propoſed to give it.

As the garden-gate was faſt, I gave it over the wall to my gardener, on whoſe integrity I could depend, and bade him carry it to a cow in the houſe, which was there, and on whom I had not made the experiment in ſummer, becauſe ſhe was in a publick paſture. He ſoon returned, and told me, that ſhe *eat*, and ſeemed to *like* it much. I now concluded, (as I ſuppoſe you would,) that the different goût with which my burnet had been received, proceeded from ſome different qualities in the ſoil. I reſolved, however,

ever, to gather ſome of the burnet which I raiſed on the gravel laſt ſummer, and try the experiment on the ſame cow with it myſelf. I did ſo, and found that the cow eat it as greedily as my gardener aſſured me, ſhe had eaten the other. I now began to think, that the different reception of my burnet proceeded from the difference of the ſeaſons; and, that either the winter froſts had *mellowed* thoſe acrid ſalts, which ſeem to occaſion the diſlike; or, that the leſs quantity of juices, which the earth may give the roots in winter, made this graſs more palatable. I reſolved, however, to make one trial more; and accordingly gathered in my handkerchief a pretty large quantity of the burnet growing on gravel; and found that the cow ſeemed to devour it with great greedineſs, even greater than before; and I could ſcarce ſave my handkerchief from her. I had, however, my *new* experiment to make, which was, to offer part of it to the cow in the next ſtall, the only one I had in the houſe of thoſe which refuſed it in ſummer. I own, I was fully perſuaded ſhe would eat it *greedily*, becauſe ſhe will eat almoſt any thing; having been uſed to weeds of almoſt all ſorts with her former maſter. I was then, gentlemen, full as much ſurprized to find her reject it with all poſſible marks of diſlike, as I had been to find the other greedily devour it.

It now remained only to try her with the burnet growing on the garden ſoil; and this ſhe rejected, as ſhe had done the other, as ſoon as ſhe ſmelled to it.——*N. B.* The cow which rejected the burnet, is the dam of her which liked it.

Muſt we not, gentlemen, from theſe inſtances, be inclined to aſcribe the liking or diſliking of burnet to the *idioſyncraſy* (as the phyſicians ſpeak) or *peculiar conſtitution* * and *palate* of the cattle?

An

* We have not reſolved the whole of the difference of cattle, with reſpect to their liking or diſliking burnet into the difference of ſoil, but into that, and the natural caprice or humour, that is found in them, operating together: where a few only, among

An account which I lately read in one of the public papers of the death of a labourer, who, in attending the maſons, fell from the ladder, and left a *large* but *helpleſs* family, revived in my mind, reflexions on the poſſibility of avoiding many caſualties of this ſort, and ſaving much time and labour, by the uſe of a crane properly diſpoſed. Every body knows how much time and labour is ſpent in the carrying ſome of the materials with which carpenters, and almoſt all thoſe with which maſons work, by perſons up ladders, and in the perſon's return down again. Every one alſo knows, how many caſualties happen, not only to the perſons carrying up ſuch materials, but to the perſons who paſs by in towns where ſuch work is carried on, by the accidental fall of part of the materials from the head of the labourer. One would think it ſo eaſy to remedy theſe

among a great number, refuſe the burnet, the difference of ſoil alone cannot be alledged as the ſole cauſe: becauſe it muſt, in ſuch caſe, equally affect the whole. Where, on the contrary, the whole of a great number agree in ſuch refuſal, it cannot be the effect of any peculiar caprice or humour, becauſe that would hold good only of a few among the number. So that this difference in them is obviouſly the effect of two conjoint cauſes: which reciprocally corroborate each other in particular caſes. For the particular diſpoſition of the beaſt is aggravated by that quality of the burnet, received from the ſoil, which tends to make it generally diſguſtful; and renders the effects obſervable, where they otherwiſe would not be ſo; and particularly in the caſe of horſes, who are leſs apt to be fond of burnet than horned cattle are.

We do not conceive the difference of ſoil, that renders burnet acceptable or diſagreeable to beaſts, lies in the richneſs or poorneſs of the ſoil, or its texture: but, probably, in the preſence or privation of ſome particular mineral or foſſile body, impregnating the plant, and rendering it diſguſtful. Poſſibly it may be ſome ſmall proportion of iron, more than is common to earth in general, and yet not enough to mark the ground with any peculiar appearance. It is well known, that where iron abounds in a vitriolic ſtate, cattle ſhew a great abhorrence to the vegetables: and it is a reaſonable ſuppoſition, that burnet may either have a greater diſpoſition to take up iron, than plants commonly have, or that a ſmaller quantity may have an effect on its flavour. To ſome ſuch circumſtance, it is highly probable this myſtery is owing: and the examination into the reſpective facts in this view will probably unravel it to us. E. O.

inconveniencies by the help of that ſimple and well-known inſtrument, a crane, that it is really amazing, that no body ſhould have uſed it on theſe occaſions; and that it ſhould not have come into general uſe.

I apprehend, gentlemen, that the neglect of this engine, on ſuch occaſions, has ariſen from the apprehenſion, that it would not be eaſy to fix a crane for the purpoſe, or to bring it into uſe when fixed. But a little reflection may convince *any* one, that theſe ſeeming inconveniencies may be obviated very eaſily. For, in many caſes, the crane may be fixed by a proper claw, and the pin to a ſpar or rib, or other part of the roof, while it remains uncovered; and when the roof is covering or covered, ſo that the crane cannot be fixed to theſe, a pole of ſufficient ſtrength may be fixed in the ground, at a convenient diſtance from the wall; and the top of this, being bored to the dimenſions of the crane's neck, or rather the under-part of it, that may be let into, and turn in it. And as to the bringing the crane to a convenient place for unloading, the neck of it may be paſſed through with croſs ſpikes at right angles; ſo that when the barrel, or bucket, or tub, or whatever veſſel is uſed to hold the materials, comes to a proper height, the workman on the top may draw the crane, and conſequently veſſel, by the firſt or ſecond ſpike, until it be brought to a ſituation moſt convenient for unloading, and may unload, and then return it to its former poſition. It would be adviſeable to have a couple of pullies, properly guarded, fixed on the higheſt part of the crane's neck, which would facilitate the aſcent of the materials; and to have a loop at the end of the rope, by which it aſcends, and an iron crook, to ſecure the weight while the baſket is unloading.

If my meaning is not ſufficiently underſtood by this general deſcription with my pen, I ſhall willingly improve it by the ſketch of my pencil.

As I conſider the *Muſeum Ruſticum*, &c. as the beſt; nay, in a manner, the only channel of information, and communication betwixt the diſtant friends of agriculture, who are not known to each other, I am always glad to

hear

hear of its extenſive reception; and hope you will do all in your power to keep up its credit.

I congratulate, therefore, not only you, but the public, on that honourable reception, which, I am well aſſured, your work meets with in Denmark. I am informed by an authority, which (I think) cannot be diſputed, that the *Muſeum Ruſticum* is regularly tranſmitted to, and diligently peruſed by that great ornament of, and friend to all literature, the prime miniſter of Denmark, Baron *Bernſdorff*.

Laſt ſummer, he commiſſioned into *England* a gentleman of ſenſe and learning, a doctor of phyſick, educated at the univerſity of *Halle*, to view the various ſoils, and methods of improving land in *this* kingdom. I ſaw the heads of his inquiries, ſigned by the baron; and was aſſured, by the gentleman, that moſt of them had reference to the *Muſeum Ruſticum*.

* That you may never forfeit a right to ſuch an honour, in foreign countries, is the ſincere wiſh of,

GENTLEMEN,

Your humble ſervant,

Eaſt-Newton,
March 13, 1766. THOMAS COMBER.

* We are much obliged to Mr. Comber, for the great regard he appears on all occaſions to ſhew for the *Muſeum Ruſticum*; and for his diſintereſted and public-ſpirited endeavours to ſupport it by a conſtant ſupply of matter. We ſay *diſintereſted*; becauſe miſtakes have been propagated, that he had ſome concern in the publication of the work, from the aſſiduity he has ſhewn in his correſpondence. But we declare, that he is not perſonally known to, or has any other than a general correſpondence, ſuch as appears in his letters, with any of the editors. E. O.

NUMBER XLII.

A comparative Calculation of Expence and Profit between the Drill and the Common Husbandry, taken from Mr. Baker's *Report to the* Dublin *Society of his Experiments in Agriculture, for the Year* 1765. *Published by Order of the Society.*

An estimate of the expence upon a plantation acre of wheat, in the common husbandry.

	l.	*s.*	*d.*
TO the first plowing, commonly called breaking, for fallow, 8 horses 8 *s.* 2 plowmen 1 *s.* 4 *d.* 2 drivers 1 *s.* - - - - - - - -	0	10	4
To the first harrowing, 4 horses 4 *s.* a driver 6 *d.*	0	4	6
To the second plowing, commonly called gaurowing - - - - - - - - - - - - -	0	10	4
To the second harrowing - - - - - - - -	0	4	6
To the third plowing, commonly called stretching - - - - - - - - - - - - - -	0	10	4
To sowing the seed, 8 horses 8 *s.* 2 plow-men 1 *s.* 4 *d.* 2 drivers 1 *s.* the seed-man 8 *d.* -	0	11	0
To seed wheat, one barrel - - - - - - -	1	0	0
To rent for the year of fallow - - - - -	0	18	0
To ditto, the year the crop is growing - -	0	18	0
	5	7	0

In this account 40 *s.* are charged for 40 horses, employed in the culture of one acre for wheat, in the common husbandry; a charge which ought to be considered by the farmer, for he actually buys and maintains his horses for this business.

The crop which follows wheat is generally oats; but sometimes peas are sown instead of oats; with some, the practice is to let the peas follow oats, in which case they fallow only every fourth year; but where land receives no other assistance than what arises from fallow, it is a bad

practice not to fallow every third year. It is the general practice to plow but once for oats, and therefore it ſhall be ſtated ſo; but it is a much better practice to plow the wheat ſtubble once before winter, and again in the ſpring.

An eſtimate of expence upon an acre of oats.

	l.	*s.*	*d.*
To plowing once	0	10	4
To ſeed oats, 2 barrels	0	12	0
To harrowing 4 *s.* 6 *d.* ſeed-man 4 *d.*	0	4	10
To one year's rent	0	18	0
	2	5	2

Theſe two crops conſume three years; after which the farmer is to begin again, and to incur every article of expence ſtated in the above accounts, in order to obtain two crops more.

An eſtimate of expence upon a plantation acre of wheat in the drill huſbandry, the firſt year.

	l.	*s.*	*d.*
To plowing 4 times, to prepare the fallow	2	1	4
[This is the ſame charge as in preparing for the common huſbandry.]			
To harrowing twice for ditto	0	9	0
[This is the ſame alſo.]			
To rent for the year of fallow	0	18	0
[This charge is ſaved after the firſt year.]			
To harrowing with the drill harrows	0	0	6½
[Four acres a day may be harrowed with one horſe.]			
To ſowing with the drill plow	0	1	1
[From 3 to 5 acres may be ſown in a day.]			
To ſeed-wheat, generally 5 ſtone, but ſuppoſe 6	0	6	0
To the firſt, or winter hoeing	0	1	7
Carried over	3	17	6½

	l.	s.	d.
Brought over	3	17	6½
[Two acres may be hoed in a day, two horſes, plow-man and driver: the deſign of this hoeing is to leave the plants dry, and to meliorate the earth.]			
To the ſpring hoeing with the cultivator -	0	1	1
[To deepen the ſoil, one horſe, plow-man and driver.]			
To the 3d hoeing, *i. e.* to return the meliorated earth to the corn - - - - - - -	0	1	7
[To make the corn tiller, *i. e.* to encreaſe its branches.]			
To the fourth and final hoeing - - - - -	0	1	1
[To fill the grain and render it large.]			
To rent, the year the corn is growing - -	0	18	0
	4	19	3½

☞ *N. B.* Although the drill culture for the firſt year is very near as expenſive as the common, yet, after taking the firſt crop, the expence and labour of fallow, and loſs of time, is not to be incurred again, as is unavoidable in the common huſbandry.

An eſtimate of expence upon an acre of drilled wheat, after the firſt crop.

	l.	s.	d.
To plowing the land once - - - - - - -	0	10	4
[One plowing is all that is neceſſary.]			
To harrowing with the drill harrow - -	0	0	6½
To ſowing with the drill plow - - - -	0	1	1
To ſeed-wheat - - - - - - - - - - -	0	6	0
[Be it remember'd, 5 *ſtone is enough.*]			
	0	17	11½
To four times horſe-hoeing, as before ſtated	0	5	4
To one year's rent - - - - - - - - -	0	18	0
	2	1	3½

Thus

Thus the land is ſown again with wheat every year, and inſtead of 4 *l.* 9 *s.* which is the farmer's expence in the common huſbandry, excluſive of one year's rent of the land: in the drill method it is no more than 17 *s.* 11½ *d.* and the total expence, inſtead of 5 *l.* 7 *s.* is no more than 2 *l.* 1 *s.* 3½ *d.* rent included; whereby there is a ſaving of 3 *l.* 5 *s.* 8½ *d.* an acre.

Before the account of profit and loſs upon theſe different methods of culture be ſtated, it will be neceſſary to take notice of an objection, which may perhaps be made to the above charge of plowing in the common huſbandry. It is pretended, that three quarters of an acre may be plowed in a day, with one plow: but can it be done effectually? The land may, indeed, be *ſcratched*, but cannot really be plowed as it ought to be. The farmer ought to be cautioned againſt a trick too frequently practiſed in plowing. When a plow-man enters his plow, and paſſes acroſs the field, he turns a ſod about a foot broad; when he is to return, he enters his plow about four feet diſtant from the outſide of the former furrow, and ſo turns another ſod of the ſame breadth, which, when turned, juſt meets the former ſod; thus four feet of the land appear to be plowed, whereas the fact is, that the two feet lying under the ſods is not touched with the plow at all. This deception, added to the practice of juſt *ſkimming* the ground, enables hirelings to undertake plowing at 6 and 7 *s.* an acre. But if a plantation acre of land be well and effectually plowed, 10 *s.* 4 *d.* as charged above, will not appear too much; and it is, in fact, ſupported by the common courſe of buſineſs. When wheat is to be ſown, it is the general cuſtom to ſend a barrel of ſeed into the field with two plows, which is to ſow an acre of land, and that is the uſual day's work for two plows in the general courſe of buſineſs. Let us ſee then, what the expence will amount to. Eight cattle will be 8 *s.* two plow-men 1 *s.* 4 *d.* two drivers 1 *s.* and the ſeedsman 8 *d.* which in all makes 11 *s.* and correſponds with the above charge.

Dr.

Dr. One acre of wheat and oats in the common husbandry, for fifteen years. *Per Contra*, Cr.

		l.	*s.*	*d.*
To the expence on a wheat crop,	2d year	5	7	0
To the expence on an oat crop,	3d year	2	5	2
To the expence on a wheat crop,	5th year	5	7	0
To the expence on an oat crop,	6th year	2	5	2
To the expence on a wheat crop,	8th year	5	7	0
To the expence on an oat crop,	9th year	2	5	2
To the expence on a wheat crop,	11th year	5	7	0
To the expence on an oat crop,	12th year	2	5	2
To the expence on a wheat crop,	14th year	5	7	0
To the expence on an oat crop,	15th year	2	5	2
		38	0	10
To clear profit in 15 years		27	19	2
		66	0	0

				l.	*s.*	*d.*
By the produce of wheat,	9 barrels,	at	20 *s.*	9	0	0
By the produce of oats,	14 ———	at	6 *s.*	4	4	0
By the produce of wheat,	9 ———	at	20 *s.*	9	0	0
By the produce of oats,	14 ———	at	6 *s.*	4	4	0
By the produce of wheat,	9 ———	at	20 *s.*	9	0	0
By the produce of oats,	14 ———	at	6 *s.*	4	4	0
By the produce of wheat,	9 ———	at	20 *s.*	9	0	0
By the produce of oats,	14 ———	at	6 *s.*	4	4	0
By the produce of wheat,	9 ———	at	20 *s.*	9	0	0
By the produee of oats,	14 ———	at	6 *s.*	4	4	0
				66	0	0

Dr. One acre of drilled wheat, for fifteen years. *Per Contra*, Cr.

		l.	*s.*	*d.*			*l.*	*s.*	*d.*
To the first and	2d year's expence	4	19	3½	By the produce of wheat,	2d year, 6 barrels	6	0	0
To the ——	3d year's expence	2	1	3½	By the produce of ditto,	3d year, 6 ——	6	0	0
To the ——	4th year's expence	2	1	3½	By the produce of ditto,	4th year, 6 ——	6	0	0
To the ——	5th year's expence	2	1	3½	By the produce of ditto,	5th year, 6 ——	6	0	0
To the ——	6th year's expence	2	1	3½	By the produce of ditto,	6th year, 6 ——	6	0	0
To the ——	7th year's expence	2	1	3½	By the produce of ditto,	7th year, 6 ——	6	0	0
To the ——	8th year's expence	2	1	3½	By the produce of ditto,	8th year, 6 ——	6	0	0
To the ——	9th year's expence	2	1	3½	By the produce of ditto,	9th year, 6 ——	6	0	0
To the ——	10th year's expence	2	1	3½	By the produce of ditto,	10th year, 6 ——	6	0	0
To the ——	11th year's expence	2	1	3½	By the produce of ditto,	11th year, 6 ——	6	0	0
To the ——	12th year's expence	2	1	3½	By the produce of ditto,	12th year, 6 ——	6	0	0
To the ——	13th year's expence	2	1	3½	By the produce of ditto,	13th year, 6 ——	6	0	0
To the ——	14th year's expence	2	1	3½	By the produce of ditto,	14th year, 6 ——	6	0	0
To the ——	15th year's expence	2	1	3½	By the produce of ditto,	15th year, 6 ——	6	0	0
		31	16	1					
To clear profit in fifteen years		52	3	11					
		84	0	0			84	0	0

	l.	s.	d.
To clear profit ariſing upon an acre of land in fifteen years in the drill huſbandry - -	52	3	11
To clear profit ariſing upon an acre of land in fifteen years in the common huſbandry -	27	19	2
Greater profit on the drilled acre, in fifteen years	24	4	9

Which amounts to 1 *l.* 12 *s.* $3\frac{3}{4}$*d. per annum*, for fifteen years on the acre, *more* than by the common huſbandry.

In the drill huſbandry the crops are ſtated at three barrels of wheat leſs upon an acre than in the common huſbandry, that it may not be ſuppoſed to be over-rated; but in the common huſbandry, the crops are rated at the higheſt; fourteen barrels of oats an acre, are alſo allowed in the common huſbandry, which every farmer muſt admit to be a great allowance upon the general produce.

That the drill culture will produce ſix barrels an acre, is fully proved in Mr. *Baker*'s report at large, which will be ſhortly publiſhed, where it will be ſhewn, that much more has been produced.

Doubtleſs, it will be obſerved, that in fifteen years fourteen wheat crops are obtained in the drill huſbandry; in the common huſbandry only five wheat and five oat crops; the five other years are not only loſt, but are an heavy expence to the farmer.

A farmer having forty acres of tillage, ſuppoſing him to direct his attention to bringing it to the drill culture, would make in fifteen years 969 *l.* 10 *s.* more than he can in the common huſbandry; which is ſuch an advantage, that the greater profit in the drilled acre in fifteen years will purchaſe the fee-ſimple of that in the common huſbandry, at twenty-ſeven years purchaſe, valuing the land at 18 *s.* an acre.

Thus it appears, that in every fifteen years the fee-ſimple of all the tillage lands of the kingdom, is loſt to the community by the common courſe of tillage.

In ſtating theſe accounts, no mention is made of fences, water cutting the land, weeding and reaping, as theſe articles

ticles of expence depend upon variety of circumſtances, but in general, will be more upon the common huſbandry than the drill.

N. B. The inſtruments for the drill huſbandry may be had of Mr. *Baker*, at *Laughlin's-Town*, near *Celbridge*, in the county of *Kildare*, where his crops, and his methods of huſbandry, may at any time be viewed by any gentleman or farmer.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

If you think the above comparative calculation between the drill and common huſbandry, worth the peruſal of your readers, you will pleaſe to make uſe of it as you may think moſt proper. As ſoon as my report at large can be printed, I will endeavour to tranſmit a copy of it to you. For the encouragement of ſuch of your correſpondents and readers as are diſpoſed to enter into the drill huſbandry, I cannot omit to inform you, that I now have a field under wheat in drill, which ſurpaſſes any corn I ever ſaw in my life, at this ſeaſon, both as to colour and vigour; and it is the *third drilled* crop which has been upon the ground in ſucceſſion.

I am a well-wiſher to your work, and
your very humble ſervant,

Dublin,
March 26, 1766. JOHN-WYNNE BAKER.

NUMBER XLIII.

Further Conſiderations on the planting quick-growing Trees: with ſome particular Obſervations on the Carolina *Poplar and* Tranſylvanian *Haſel: In a Letter from* Philoſylva.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS I had particularly taken upon me the cauſe of timber-planting, too much, as I obſerved in my laſt letter, neglected by thoſe who zealouſly perſue other kinds

of rural improvement, I received great pleaſure from ſeeing the letter on the Lombardy poplar, in your next Number, publiſhed for March. As it tended to demonſtrate, by another inſtance, added to that which I had given, the very great private, as well as public advantage, which may accrue from the planting quick-growing trees. That kind of poplar is not, however, from any intelligence I can hitherto collect at preſent, obtained in England; but an addreſs was ſome time ago made, to the Society for promoting arts, from France on that head: and the following advertiſement was tranſmitted at the ſame time to them. As it may tend to ſupply the means to private gentlemen of procuring this tree, and, likewiſe, gives an intimation of a peculiar kind of eſtabliſhment in France of public nurſeries, opened under the direction of the ſocieties for promoting agriculture, which may poſſibly excite a deſire in gentlemen of public ſpirit, to attempt ſomething of a ſimilar nature here: I have, therefore, copied the French for you, and likewiſe given a tranſlation of it; which I think may do ſervice to the cauſe I mean to promote, by my correſpondence with you.

"PEPINIERE A SENS.

"Le bureau de la ſocieté royale d'agriculture, de la "generalité de Paris, établi à Sens, ayant propoſé aux "citoyens de cette ville, l'entrepriſe d'une pepiniere "d'arbres, foreſtiers, fruitiers, d'alignemens, arbriſſeaux, "et arbuſtes, qui peuvent s'elever en pleine terre: cet "établiſſement, dont, l'utilité a été generalement recon-"nue, vient d'être commencé ſous la protection de cette "ſocieté. On y trouve déja des peupliers d'Italie ou de "Lombardie, de differentes groſſeurs, et des jeunes plans "de cette arbre, bien enracinés, pour faire des allées "qui ſuppléent aux charmilles & qui en tres peu de tems "ſont de beauté ſingulieres. Tout ces plans ſont elevés "ſans fumier; & avec les ſeuls labeurs. On y diſtribue des "boutures d'un an, fruiches, & d'une bonne eſpece, aux

" different perſonnes, qui veulent faire des pepinieres. On " indique les moyens de les planter, avec ordre, & avec " ſuccés ; & les ſoins qu'on prend pour le tranſport, les " mettent a l'ábri, des inconveniens du trajèt, en quelque " lien, qu'on les envoye. On ſera dans la ſuite en état, " de diſtribuer toutes les autres eſpeces d'arbres.

" On s'addreſſerà au ſieur Etienne Guigne, rue du Tri- " pos à Sens Bourgoyne."

" THE NURSERY AT SENS.

" The office of the royal ſociety of agriculture of the " generality of Paris, eſtabliſhed at Sens, having propoſed " to the citizens of this town, to make a nurſery of foreſt- " trees, fruit-trees, coppice-wood, ſmall trees, and ſhrubs, " which may be raiſed in the full ground, or open air. " Such a nurſery, of which the utility has been univerſal- " ly acknowledged, has been accordingly lately opened " under the protection of that ſociety. There has been " choſen for this purpoſe, near the town, a piece of land " of moderate goodneſs : and there has been already pro- " cured, Italian or Lombardy poplars of different mag- " nitudes : and young plants of that tree, well rooted, to " make walks which lead to groves, and are, in a very ſhort " time, extremely beautiful. All theſe plants are raiſed " without dung, by labour only. Sets or cuttings of this " tree of one year, freſh, and of a good kind, are diſtri- " buted to ſuch perſons as are deſirous to make nurſeries, " and full information is given of the means of planting " them properly and ſucceſsfully : while at the ſame time " care is taken in the package of them, to avoid their be- " ing ſubject to any damage in the carriage, to what- " ever places they may be ſent. Proviſion is likewiſe " made to be able, in a ſhort time, to diſtribute all the " other kinds of trees.

" Application ſhould be made to Mr. Etienne Guigne in " the rue de Tripos at Sens in Burgundy."

By this advertiſement it appears, that any gentlemen, who have a correſpondence in Burgundy, or the neighbourhood of Sens, may procure plants of this tree; and I make no doubt, but that from the earneſtneſs ſhewn in the application to the Society of London for promoting arts, Mr. Guigne would be very ready to do whatever was in his power, to gratify any private gentleman, who ſhould deſire it of him: and the marquis de Chambray, who, as was obſerved by your anonymous correſpondent, takes a particular pleaſure in giving away ſets, would certainly oblige any gentleman who would apply to him, at Fillieres in Normandy.

It appears alſo, by this advertiſement, not only how attentive to, and aſſiduous in all kinds of rural improvements, the French at preſent are: but of what particular conſequence they eſteem the propagation and culture of quick-growing trees.

And I muſt further obſerve, that the eſtabliſhment of ſuch nurſeries, not only as a repoſitory for new and ſcarce kinds of plants, but for the diſtributing cuttings or ſets of them, is a very effectual means of encouraging the undertaking of private perſons, to make ſuch plantations here. The giving of cuttings of mulberry-trees to all, who will make plantations of them, is one of the means, which the ſociety of Berne have taken, for the encouragement of the production of ſilk in that country; and I am informed the King of Pruſſia has done the ſame.

It were much to be wiſhed, we were not behind the French in this particular: but that we had ſome public nurſery or garden, which was not, merely for ſpeculation, like thoſe we have at preſent, from which there ſeems to have accrued very little advantage. In ſuch a nurſery the ſeeds, that have been ſent to the Society for promoting arts, might have been raiſed, and their product preſerved: as well as thoſe obtained by private gentlemen, which are in all probability loſt: and if plants or cuttings were, by this means, conveyed and diffuſed to remote parts of the coun-

country, it would be a very efficacious means of improvement, and the introduction of uſeful trees, &c.

But to return to the ſubject of the Lombardy poplar, though I am extremely deſirous we ſhould be poſſeſſed of it, yet I entertain ſome doubt whether we have not, at preſent, a tree of the poplar kind, that is at leaſt equal to it, in beauty, quickneſs of growth, &c. The tree I mean is the large-leaved American poplar, commonly called the *Carolinian*, or *Carolina* poplar; which I mentioned particularly in my former letter. It is amazingly rapid in its growth, elegant in its figure, and beautiful in the verdure of its very large foliage: and, as far as I can conjecture, not inferior in its wood to the Lombardy poplar. This is likewiſe to be propagated from cuttings of any magnitude: which ſcarcely ever fail, but from ſome groſs miſmanagement, if planted at the proper ſeaſon.

There are ſome other trees, which, like the willows and poplars, might be proper ſubſtitutes for the large foreſt-trees, in the view of affording timber: and there are many of a ſmaller kind, that might be applied to various valuable œconomical purpoſes, as having advantages over ſuch as are at preſent cultivated for the ſame uſes.

Among thoſe which I conſider in this firſt light, a very large ſpecies of nut-tree is one of the principal. It grows in ſize equal, at leaſt, to the foreſt-trees of the ſecond ſize: and ſhoots in upright boughs or branches, of an extreme great length and ſtraightneſs. Its growth is amazingly quick: and the wood extremely tough. Theſe qualities, of great length and ſtraightneſs in the boughs, together with the toughneſs, would make the poles produced by it uſeful, and the toughneſs would render the wood very advantageous for many purpoſes. Some of the older botanical writers, mention this tree as a native of Tranſylvania; and ſay that it rivals the largeſt foreſt-trees in its magnitude: I have never ſeen any that were more than four years old: and if I might have concluded the future magnitude from that which they then had: I might well have adopted that belief. The figure and general appear-

ance

ance of the trees, excepting magnitude, very much reſemble the common haſel, but the nuts which I have been ſhewn by the ingenious Mr. Fletcher, during his reſidence with the late duke of Argyle, out of his collection of ſeeds, were very ſmall; much leſs than the larger common nuts, notwithſtanding the exceſſive bigneſs of the tree. The firſt, I have heard of, in our country, were a few raiſed from ſome nuts brought from Vienna by the earl of H——d, and which were, when I ſaw them, in the gardens of the late duke of Argyl at Whitton, and of the earl of Northumberland at Sion.

From the quick growth of this tree, there can be ſcarcely a doubt, but that it might, by proper management, be propagated from cuttings; and it could not fail, both from the ſtraightneſs, largeneſs, and toughneſs of the poles, formed by its boughs, as well as from the tenacity of the wood, produced by the body of the tree, to be very uſeful for many purpoſes; and very advantageous, as arriving, in ſo ſhort a time, at a profitable maturity.

Of the other kind, intimated above, that is, ſuch ſmaller trees, as might anſwer more beneficially the indiſpenſible uſes of ſeveral we now employ, I ſhall only mention two, which would be, in all probability, great improvements in the making fences.

The one is a kind of haw-thorn, much reſembling our common quick; but growing much faſter; and riſing much higher and ſtronger. It is found in Canada, where it is uſed for hedges, from whence a quantity of the haws, or fruit, was ſent to the London ſociety; who diſtributed them among ſuch gentlemen, as were diſpoſed to try to raiſe the trees from them. I gave ſome parcels of them to ſeveral of my friends, not having at that time an opportunity of ſowing them myſelf; but I have not heard, hitherto, that any of them were raiſed. A kind of haw, that would make higher and thicker hedges, and in a leſs ſpace of time, would certainly be a very valuable improvement; and, by the account which is given of this kind of haw-thorn, it poſſeſſes all theſe qualities in an extraordi-

nary

nary degree; and it were to be wiſhed, therefore, that if any plants were raiſed from this parcel of haws, the public had ſome account of them in due time. It is now four years ſince they were ſent hither: but as this ſeed is long in riſing, it will require ſome years more to form a ſatisfactory judgment.

The other plant, I recommend to further inquiry, is a kind of dwarf oak, uſed in ſome parts of North America for making hedges and fences. It grows very faſt, and becomes ſo thick by cutting with ſheers, that a bird, or mouſe, can ſcarce penetrate it, when in full perfection. The acorns are ſown in rows or drills, where the hedge is propoſed to be made; which admits of being raiſed to a conſiderable height. Such a fence as this would be a ſcreen from the wind in winter, as well as a ſecurity of the incloſure; whence a hedge of this kind would be uſeful for many purpoſes here: and the plant would, perhaps, on further examination, be found capable of being rendered ſerviceable in ſome other ways. It were to be wiſhed, therefore, we were poſſeſſed of it.

In my former letter, in ſpeaking of the Norfolk willow, I mentioned, that I did not know who ſucceeded Mr. North in his buſineſs, nor whether his ſucceſſor continued to ſupply the ſets as he had done. Some little time afterwards, being applied to by a friend, in conſequence of what had been there ſaid reſpecting the advantages of plantations of that tree, to procure ſome ſets, I went to Lambeth to inquire, and found that Mr. North had reſigned his buſineſs, for a year or two before his death, to one Mr. Sheilds, who continued it on in the ſame manner: and who is prepared to furniſh any quantity of the willow ſets. I think it a piece of juſtice, therefore, to mention this fact; becauſe, being ignorant of his having long advertiſed, that he conducted the buſineſs, in all reſpects, in the ſame manner as Mr. North, my expreſſing a doubt with relation to the willow ſets not being to be obtained there, might have prevented ſome applications, which might otherwiſe have been made to him. To take off the chance of any

conſequence of this kind, I muſt declare that I found him very well provided with them, and all the plants which are uſual in the nurſeries; as well as a good collection of thoſe which are more rare; and alſo very intelligent in the management of plantations, either for pleaſure or uſe. Amongſt the reſt, he has an ample ſtock of the *Carolina poplar*: and could in time ſupply cuttings for a conſiderable plantation of that valuable tree: as well as of both the kinds of the mulberry-trees, if your correſpondent Agricola's ſcheme of attempting the production of ſilk in England ſhould take place, and occaſion a demand for them. You will excuſe my ſaying this, that I might avoid the chance of doing harm to a perſon who was then a ſtranger to me; but who appears, on my converſing with him, to have merit in his profeſſion; and as, beſides, it anſwers the further end of promoting the view I earneſtly deſire to effectuate, of increaſing the numbers of plantations of quick-growing trees, by pointing out where the ſets of the Norfolk willow are to be obtained. In my next I will endeavour to ſend a further aid to this deſign, by communicating ſome inſtructions and remarks, reſpecting the propagation of trees by cuttings and other expedite methods; and alſo a more particular account of the growth, cultivation, &c. of the *Carolina poplar*, and ſome other valuable trees. In the mean time I remain

Your conſtant reader, well-wiſher,

and humble ſervant,

PHILOSYLVA.

NUM-

NUMBER XLIV.

Some further Inſtructions and Obſervations relative to the making Pot-aſh, intended for the Uſe of the Colonies: In a ſecond Letter from Mr. Doſſie.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN my former letter to you, I complied with the requeſt of your correſpondent, T. P. in giving you the proceſs for making pot-aſh, I communicated, at their deſire, to the Society for promoting arts, &c. and which, in conſequence of their publiſhing it in their book of premiums for the uſe of the colonies, for the laſt four or five years, appears to have been a principal cauſe of the eſtabliſhment of that important manufacture. I then ſubjoined to it alſo, at your correſpondent's further deſire, my opinion of the practicability, and means of rendering that proceſs advantageous in Great Britain; and to this alone, I then confined my obſervations.

But that letter has occaſioned my being applied to, from ſeveral quarters, for aſſiſtance in the further extention of this article in America, by eſtabliſhments of manufactories of it in thoſe parts, where they have not been already begun; and which are too remote to obtain information eaſily from the others.

A gentleman greatly concerned in a different branch of commerce, and well known to the Society for his liberal talents and earneſt deſire to ſerve the public, informed me, he had obtained a grant of lands for ſome perſons under his protection, in a colony where this manufacture has not hitherto been attempted; and was going to fit them out, with a complete *apparatus* for making pot-aſh, at his own expence, in order to the eſtabliſhment of a work by the aid of that proceſs: but wanted the explanation of

ſome particulars with relation to which, he did not think it fully explicit.

Another very able gentleman, agent of a northern colony, made ſimilar inquiries of me, on account of a perſon, who has a very conſiderable grant of lands, in that colony, on condition of clearing them: which nothing can ſo well enable him to perform, as the erecting a pot-aſh work, that will immediately repay him with profit, all the expence of labour in cutting down and clearing away the wood.

The ſame kind of information has been aſked of me by ſeveral other gentlemen who are intent on the commencing this manufacture in the ſouthern extremities of our new American poſſeſſions: and I have been thence induced to comply with theſe ſeveral requeſts, in a general way: and, at the ſame time, endeavour to render more diffuſedly uſeful, through the channel of your work, the obſervations below given, with reſpect to their queries and ſome other material points; all which I conſider, as a proper ſupplement to the above-mentioned proceſs: particularly in the caſe of thoſe places, where the iron part of the *apparatus* for making pot-aſh cannot be made, but muſt be carried from hence, or had from ſome other diſtant part.

The principal queries, that have been made to me, are;

1ſt, *Whether the putting the aſhes in caſks, and keeping them for any length of time in that ſtate, before they be uſed for the lye, be an indiſpenſible, or eſſential part of the proceſs?*

2dly, *What time it is requiſite the water ſhould ſtand on the aſhes before it be drawn off, in the form of lye?*

3dly, *What is the method of diſtinguiſhing, when the laſt part of the evaporation, or reduction of the ſalt to a dry ſtate, is compleated; and the fire ſhould be diſcontinued?*

4thly, *By what marks a judgment may be formed of the goodneſs of the pot-aſh produced?*

Beſides the conſiderations on theſe queries, I have thought fit to add ſome remarks, that may be of very material ſervice to thoſe who enter on this undertaking; and who can ſcarcely be ſuppoſed to be ſo much acquainted with chemi-

cal

cal operations, as not to want a guide in every particular of importance; eſpecially, in theſe colonies, where no manufactories of this kind having been eſtabliſhed, they cannot profit by the experience of their neighbours.

In very large works, the wood for making the aſhes may, in dry weather, be burnt on the ground: and it is there of ſome conſequence, to practiſe the moſt proper manner. In ſuch caſes, the wood may be cut into logs of any magnitude, that is moſt convenient, to be carried or rolled: and they ſhould be laid on a very dry firm ſpot of ground, in the manner of a pile, in which the greateſt hollow, that can be made, ſhould be left betwixt them. Theſe hollows ſhould be filled with bruſh-wood: which, as it burns away, ſhould be renewed: eſpecially in thoſe parts, where the fire ſeems to ſlacken in the logs. The whole pile, may likewiſe, from time to time, be covered with bruſh-wood, and boughs with the leaves on them: the ſmothering effect of which is beneficial to the product of alkaline ſalt. When the fire is ſuffered to decline, and the whole is nearly conſumed, all the remaining pieces of charcoal, or unburnt parts, ſhould be raked together from the extremities, and thrown on the middle of the fire: and indeed the exterior part of the aſhes themſelves, ſhould be ſo treated; and ſome freſh dry buſh may be added, if neceſſary, to complete the calcination or thorough reduction to aſhes, of the whole. It is extremely material that this be effectually performed, and that all unburnt parts of the wood, or charcoal formed in the burning, be carefully raked out; and either burnt or taken away. For from a neglect of this, as we ſhall ſee below, not only the laſt part of the evaporation of the lye, is made tedious and difficult: but the pot-aſh itſelf depraved, and rendered unfit for bleaching; and ſome other uſes, as well by its ſtaining as cauſtic quality.

When the wood is burnt on a kiln or grate, as muſt be practiſed in wet weather, the ſame rules ſhould be obſerved: and the fire ſhould rather be kept in a ſmothering, than fierce ſtate, till the whole be nearly conſumed. But

then

then the fire may be allowed to be ſtronger, and the aſhes paſſed through it.

As to the firſt query, reſpecting *the putting the aſhes in caſks, and keeping them for ſome time*; that method is not eſſentially neceſſary. In very large works it would occaſion embarraſſment and delay: and though there may be ſome little gain from it, in the quantity of alkaline ſalt obtained: yet that does not countervail thoſe inconveniences. The aſhes may be, therefore, gently ſprinkled with water, and laid in a heap in any place, defended from rain or wet, in order to be uſed ſooner or later, even immediately, as may be commodious for the diſpatch of the work.

With reſpect to the ſecond query, *how long the water ſhould ſtand on the aſhes before it be drawn off?* The leaſt time ſhould be about four-and-twenty hours, eſpecially when put on a ſecond quantity of aſhes. It may be as much longer, as is moſt convenient: for there is no limitation, either way: except that ſufficient time muſt be given, for the water to diſſolve the alkaline ſalt.

In the proceſs given to the Society, the view was, rather to communicate the general method, and incite the trials of it in ſmaller quantities, and by the cheapeſt *apparatus*, than to give compleat inſtructions for the moſt profitable conduct of very large works. But at preſent, as it is known, advantages can be had with certainty, from ſuch an undertaking, the *apparatus* ſhould be adapted to conſiderable quantities, by thoſe who begin. In this view, it will be a great improvement, to have inſtead of one only, two evaporating caldrons of different magnitudes, and form. The one ſhould be as large, as can be procured to be caſt; and ſhould be wide in proportion to the depth, even as two to one. The other ſhould be leſs by about two-thirds in meaſure; and ſhould be twice as deep as it is wide, and of a figure nearly cylindrical, or tapering only in a ſmall degree. They ſhould be both of caſt iron; and made as thin as poſſible in the upper part: but of the thickneſs of an inch at the bottom. The largeſt ſhould be ſo ſet, that about three-fifths of its ſurface may be expoſed to the fire:

and the leſſer three-fourths. They may be ſet in the open fire, without any flew or worm round them, in an oven-like furnace, at about fourteen or fifteen inches from the grate or bars: and the lower and upper parts of the furnace, excepting as to the worm or flew round the pot, may be formed like that of a common culinary copper for waſhing or brewing.

The large caldron is intended for the evaporation of the lye, till it begin to ſhoot or form a pellicle or cruſt, on the ſurface of the boiling fluid: and the other, or ſmaller, is deſigned to receive the ſaline matter when brought to this ſtate, in the firſt; from whence it is then to be removed. There is a great advantage in this uſe of two pots or caldrons: becauſe the ſize and form of the leſſer caldron, renders the action of the heat much more effectual, and quick in its operation, in bringing the ſalt to a due ſtate of dryneſs, and purity from the burnt oil, than thoſe of the larger: while that, on the contrary, is much better accommodated to the aqueous evaporation, or exhalation of the greateſt part of the water.

When this *apparatus* is carried from England to America; or is to be obtained only from ſome diſtant place; it is extremely proper to carry duplicates of the caldrons, or even three of the leſſer kind. For the bottoms of caſt iron veſſels fail ſometimes unexpectedly, in particular places, when expoſed to ſtrong heats: and if a caldron was wanting to replace any, that ſhould fail, it would be the means of a total ſtop to the work, till ſuch time as another could be ſent for.

With relation to the third query, or *by what means it can be diſtinguiſhed, when the laſt part of the operation (or what has been very improperly called in America* fluxing the ſalt) *is completed*, the following circumſtances muſt be attended to. The ſalt, in the laſt part of the evaporation, will remain in a fluid ſtate, notwithſtanding it be of the degree of heat, that will burn vegetable or animal ſubſtances; and will then appear blackiſh, or brown, in proportion as the aſhes were more or leſs free from the coal, or burnt oil of the

wood.

wood. While this appearance remains, the fire ſhould be continued; and even encreaſed, if no change be produced after four-and-twenty or thirty hours, in the caſe of very large caldrons. The fluid will, however, at laſt concrete, and form a dry hard maſs: which, if it appear white, on a ſmall ſpecimen being taken out, and ſuffered to cool, the fire may be immediately diſcontinued: but if the colour be brown, or a very dark grey, it may be kept up an hour or two longer: though theſe colours will not always diſappear, if the lye be impure from the burnt oil, or coal of the wood, as before mentioned.

As to the laſt query, *how the goodneſs of the pot-aſh is to be diſtinguiſhed?* Where there is no intended adulteration, the following marks may be depended on. That the ſalt be white; and either of a ſtony or unctuous conſiſtence, inclining ſomewhat to tranſparency, rather than powdery and opake. That it diſſolve almoſt intirely in water; giving only a ſlight whitiſhneſs, or milky caſt, without any brownneſs. As the pot-aſh deviates from theſe qualities, it loſes of its value and marketable price: but nevertheleſs, though it be unfit for bleaching, and ſome other uſes, it may be ſtill ſaleable for making ſoap, and ſome other purpoſes.

Theſe criterions or marks are, however, available only in caſes where no depravity or faultineſs is in queſtion, but what ariſes from the miſconduct or accidents of the preparation: for where deſigned adulterations, are practiſed, ſome or all of ſuch criterions or marks may be preſerved, and yet the commodity greatly debaſed and ſophiſticated. The detecting ſuch frauds cannot be taught, without an examination of the nature and relative qualities of the ſeveral ſubſtances that may be employed in the adulteration; which would require more room than the proper compaſs of this letter: and indeed, the knowledge of them is more important, and requiſite to the perſons, who buy, than to thoſe who make pot-aſh. Since to the latter, it is ſufficient to underſtand the degree of value of what he produces: and the beſt means of attaining to this value in the

product

product of his operations. The criterions or marks above mentioned furniſh the means of this judgment on the perfection of unadulterated pot-aſh: and the beſt method of coming up to them in the practice, is to keep the aſhes clear from any of the burnt oil, or bits of charcoal produced from the wood, whence ſuch aſhes are obtained; and the lye clear from any of the earth of the aſhes, by drawing it carefully off, or ſuffering it to ſettle: and to give a ſufficient heat in the laſt part of the evaporation, according to the preceding directions. If, nevertheleſs, any of the earth of the aſhes be among the ſalt, it will be perceived, by its not diſſolving on the addition of water: but this does not otherwiſe deprave or injure the commodity, than by taking off in proportion ſo much of the real quantity of the alkaline ſalt. Or if, otherwiſe, the fiery oil abound, in the pot-aſh, it will be perceived by the brownneſs and extreme hot cauſtic boiling effect of it on the tongue; and by the diſcoloration of the water, in which any of the ſalt is diſſolved. In any degree of this laſt depravity, the pot-aſh loſes proportionably of its value: and, in a great one, it becomes unfit for bleaching, and ſeveral other purpoſes, as it has ſometimes then a ſtaining quality, that will ſpot the linnen; and a corroſive one, that will eat it. So that this is the principal failure, that is to be guarded againſt, when pot-aſh is made in the manner directed by the proceſs in queſtion.

I ſhould wiſh this letter were inſerted the very firſt opportunity, for reaſons which are ſufficiently evident, from the facts mentioned in the beginning: and your compliance with that requeſt, will oblige

Your very humble ſervant,

R. Dossie.

NUMBER XLV.

An Account of the Strawberry or Hop-Trefoil; in Anſwer to a former Inquiry relative to it. In a Letter from Mechanicus.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS the reverend Mr. Comber intimates a deſire of a further information relative to ſtrawberry-trefoil, recommended to the notice of the public by Mr. Wynne Baker, ſee No. LX. p. 340 of the 5th Vol. of the *Muſeum Ruſticum*; I am much pleaſed that I have it in my power, to give ſome account of this yet little-noticed, but very extraordinary plant. I cannot pretend to enter into a juſt botanical deſcription of this plant, but will attempt the beſt I can; and humbly hope that Mr. Comber, and the editors, will overlook every defect of ſentiment, and expreſſion, both in this, and every paſt and future letter, that is and will be ſigned by Mechanicus.

Strawberry-trefoil, or hop-trefoil, are, I conceive, ſynonymous terms, being given, I ſuppoſe, to this ſpecies of trefoil, from the near reſemblance of its flower, to that of hops in flower, or to a ſtrawberry, a little before it is ripe. The colour of the root is whitiſh, abounding with fibres, the leaves are three together, and are ſmall, oval, and of a paliſh green; the ſtalks, in a natural ſtate, are ſix or eight inches high; the flowers are ſmall, inclined to yellow, ſtanding in oval tufts; the ſeed is ſmall, ſhining, and yellowiſh, incloſed in dark-coloured huſks, in a head or cluſter. Hop or ſtrawberry-trefoil, is a native of England, and is up very early in the ſpring: the moſt ſevereſt winters do it but little injury; and, what is moſt deſirable, it ſeems to bear indifferently every kind of ſituation; for I have ſeen it grow in low watery meadows, and upon gravelly banks, and very frequently I have ſeen it in the bottoms and ſides of old marl-pits; ſo that ſoil and ſituation, alike favour its growth.

I am quite of Mr. Wynne Baker's opinion, that it ſeems to deſerve particular notice, from what I have ſeen of its uncultivated luxuriance, and other particular properties, deſerving the higheſt regard and attention of the curious.

I collected near an ounce of its ſeed the laſt ſummer, and have ſown the greateſt part of it in the beginning of the current month in drills, and broad-caſt, along with a variety of other graſs-ſeeds, *&c.* (cultivated in the ſame manner) ſome of which lucern, burnet, timothy-graſs, and bird-graſs, I have procured from Mr. Rocque; ſome are ſuch as are in common cultivation; ſome I have gathered myſelf, with a deſign, in one view, (under my own manual cultivation) to make a juſt eſtimate of their comparative excellence; the reſult of theſe experiments I intend to make a part of my future correſpondence *, not doubting but the editors of the *Muſeum Ruſticum* will give me room to make my experiments known to the curious cultivators of every promiſing and uſeful vegetable, belonging to, or neceſſary to make improvements in paſturage, at preſent the laudable perſuit of many of the correſpondents of the *Muſeum Ruſticum:* and, as I have the honour to have ſome regard and attention paid me by none of the leaſt worthy of that number, I ſhall, with my very grateful reſpects, wiſh ſucceſs to every individual concerned in promoting and encouraging ſo uſeful and laudable an undertaking, as makes the variety included in your periodical publication. None can have a greater regard for it, than,

GENTLEMEN,

Your obliged humble ſervant,

Near Stafford,
April 20, 1766.

MECHANICUS.

* We think the public and ourſelves much obliged to Mechanicus, for the zeal and aſſiduity, with which he ſeems to perſue the improvements of agriculture: and the means, he declares it to be his intention to perſue, are ſo proper, that they cannot fail of being effectual. We ſhall, with great pleaſure, inſert in our work, any obſervations, that may be the reſult of them, and afford every other aſſiſtance in our power, to promote his views. R. E.

NUM-

NUMBER XLVI.

A Propoſal for attempting the Production of Silk, according to Agricola's *Plan, if proper Aſſiſtance, as promiſed by him, be given.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

THIS being a very bad day, it gives me an opportunity of looking into your valuable ſelect papers, &c. amongſt which, I am greatly delighted with your worthy correſpondent Agricola's hints on the ſilk-worms; and his rational obviations of the four principal objections, which may be alledged to its being brought to a national manufacture of great utility. I read them with pleaſure to my wife, who wiſhes to be intruſted with ſome of thoſe uſeful animals. I have ſome of the eſſential neceſſaries for carrying on this work in a moderate degree. Such as mulberry-trees, black, and white, in great numbers, and ſome buildings now in diſuſe, that may, at a ſmall expence, be rendered very proper habitations for thoſe gentry. I want inſtructions, how to put them in a proper condition to accommodate them; and alſo to manage them through all the various proceſſes of the buſineſs; for which purpoſe, I beg Mr. Davis will ſend me, by the bearer, Mr. Pullen's treatiſe, of which Agricola makes mention, or favour me with any other * aſſiſtance you think will contribute to my deſign. Whatever progreſs and ſucceſs, I make in this or any other like undertaking, I will readily tranſmit to you; and am Your humble ſervant, &c.

Lambeth, April 2, 1766. J----- S---ds.

* We are extremely glad to find the effects of Agricola's endeavour to introduce the production of ſilk into Great Britain ſo ſoon take place; and we doubt not but he will do his utmoſt to procure Mr. S—ds all the aſſiſtance he has promiſed. As to our own parts, we ſhall readily lend our aid to promote ſo laudable a deſign, as well by any private as public means in our power: and ſhall think it the greateſt honour to our own undertaking, that it has or may contribute, to the eſtabliſhment of an art, pregnant with ſo many, and ſuch great national advantages. E. O.

Muſeum Ruſticum, &c.

For MAY, 1766.

VOLUME the SIXTH.

NUMBER XLVII.

An Account of the extraordinary Size of neat Cattle and Sheep in Tees Vale, *and the Neighbourhood of* Yarm.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

YOUR correſpondent Mechanicus, whom I honour for his ingenuity, and good ſenſe, ſeems to ſpeak of the weight of his neighbour Stubb's bull as ſomething very extraordinary.

The weight of the quarters, however, and even much higher weights, are very familiar to us here: and in the ſheep way, I can tell him, for the honour of the Tees Vale, that William Story, farmer, and at that time under-tenant to Mr. Stephenſon of Trafford-Hill, near Yarm, had, about ſeven or eight years ago, a tup, which, at three years old, weighed (as was found on trial in the field before ſeveral people preſent on the occaſion) twenty-eight ſtone, and ſix pounds (14lb. of ſixteen ounces each to the

ſtone.) This tup was ſold, by him, to Mr. Banks, of Harworth, near Darlington, for fourteen guineas, with which he earned a great deal of money, by riding the ewes of the neighbouring gentry, and others, at half a guinea each ewe.

Robert Gibſon, Eſq; of Newſham Banks, to whom this neighbourhood is greatly indebted * for his indefatigable care, and aſſiduity, in promoting, by every means in his

* It were to be wiſhed, that a more general attention were had to the improvement of the breed of every kind of animal, and vegetable, which are appropriated to any œconomical purpoſes. In almoſt all inſtances of peculiar properties and qualities in the individual, the progeny, for the moſt part, more or leſs, partake of the ſame, though in very various degrees; and ſome particulars not at all. If, therefore, thoſe of them, in which ſuch qualities are moſt predominant, be ſucceſſively ſelected for breeding, the qualities themſelves will be greatly augmented, even to a very high degree, in many caſes. This principle extends as well to form and magnitude, as to diſpoſitions, paſſions, and other qualities: and to vegetables, with reſpect to their proper œconomy, as well as to animals. The peculiar ſoil and climate of places, adds much to this in many caſes: and the qualities imputed to the breed, by the effect of ſoil and climate, will frequently continue in the race for a conſiderable time. It would be, therefore, a great improvement, in many places, to change an inferior breed intirely, with reſpect to neat cattle and ſheep; and to bring, from ſome favourable part, a freſh ſtock, choſen on both theſe principles: that is, to have the largeſt kind, as far as it ſeems to depend on the place they are taken from; and the largeſt particulars of that kind: for theſe two cauſes of largeneſs in the breed, when combining, will give a greater ſecurity of the continuance of the deſired quality, than either of them ſingly. This is to be done originally by perſons of property only: but if, according to the example of the gentleman, mentioned in this letter, many others would attempt improvements of the ſame nature, particularly in places, where at preſent the breeds of each kind are ſmall and defective; not only very great advantages would accrue to their reſpective neighbourhoods, and the public in general, but an ample profit to themſelves. In this view, we think communications of extraordinary inſtances of ſize, produce of wool or milk, or any other valuable qualities, may be very intereſting and ſerviceable: as they not only furniſh the motives of executing ſuch deſigns; but the means, by the knowledge of which parts of the country, or particular places, may ſupply what is wanting for ſuch improvements. O.

power,

power, the breed of fine large ſheep, in this county, has now a tup, got by the above, which (though never, that I have heard of, weighed,) is thought, by moſt judges, though ſomething inferior in weight, to be a more compact well-made ſheep than his ſire. This tup, Mr. Gibſon has ſuffer-to ride ewes at half a guinea each; and, I am told, intends to advance him to a guinea next ſeaſon.

Mr. Banks of Dinſdale, brother to Mr. Banks of Harworth, about five years ago, clipped twenty-two pounds and a half of wool, from off a tup lamb: and a gentleman, in the ſame neighbourhood, clipped ſixteen pounds of wool from off of an ewe five years old.

If theſe may be eſteemed articles worthy a place in your uſeful miſcellany, you are at liberty to publiſh them. A want of the powers of deſcription, has long prevented my being a contributor to your very uſeful and commendable work, otherwiſe than by buying it myſelf, and recommending it to others. I wiſh it could be afforded lower than a ſhilling a number, as I am perſuaded it is the price that prevents its being bought, by numbers of very intelligent and ſenſible farmers in this neighbourhood: ſome of which are my tenants, and have given me that reaſon in excuſe, when I have ſtrongly recommended it to them: as I have done to many others.

I heartily wiſh you ſucceſs, and the encouragement your entertaining, and very uſeful undertaking, deſerves from the public.

I am, GENTLEMEN,

Much yours,

Yarm, April 30, 1766. T. K.

P. S. I have made ſome experiments on lucern, burnet, and Timothy-graſs; which I will take ſome other opportunity of commmunicating it to you: but at preſent I have not leiſure.

NUMBER XLVIII.

Observations of the Advantages of Peat-Aſhes, in dreſſing Land, and the Manner of preparing and uſing them.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

YOUR very conſtant correſpondent, Mr. Comber, in No. 58, of your Fifth Volume, gives you ſome obſervations on peat-aſhes; as they are commonly made, and uſed in Yorkſhire. It is poſſible, that when made in the manner he mentions, and afterwards expoſed for ſeveral months together, in an open dunghill, to the ſun, air, and rain, they may have ſome fertilizing quality ſtill left in them; but, I fear, hardly ſuch as is ſufficient to make them worth the trouble of carrying out upon the land. Peat-aſhes, purpoſely and properly burnt for a manure, are noble improvers, both of corn, and graſs land: but the ſubſtance, from which they ſhould be got, is an underſtratum of the peat; where the fibres and roots of the heath, *&c.* are well decayed. Indeed, the very beſt are procured from the loweſt ſtratum of all. This will yield a large quantity of very ſtrong aſhes, in colour (when firſt burnt) like vermilion, and in taſte very ſalt, and pungent. Great care and caution ſhould be uſed in burning theſe aſhes; and, alſo, in preſerving them afterwards.—In the firſt place, the peat ſhould be conſumed as ſlow as poſſible: the fire being but juſt kept alive; and never ſuffered to flame out. It ſhould, therefore, be conſtantly attended in the day-time; and well covered up at night, with an addition of freſh peat, laid on the outſide.—If, in the morning, it ſhould be found too low, and in danger of being extinguiſhed, either by rain, or too cloſe a covering, ſtirring it up, with a ſtrong ſtake, (kept ready for that purpoſe) and thruſting a little

dry

dry turf, or bruſh-wood, into the middle of the heap, will very ſoon reſtore it to a proper degree of heat. One man will keep about a dozen fires going: and they will, in a ſummer ſeaſon, produce a very large quantity of theſe moſt valuable aſhes. About the middle of September, (before the autumnal rains come on) the fires ſhould be ſmothered out; by laying, on every heap, a large covering of heath parings; ſo as to prevent any air from getting into the heaps; in order that they may cool gradually; and be kept from any rain that may happen to fall before they can be removed. As ſoon as the aſhes are cool enough, to be ſafely carried, and laid together, they ſhould be conveyed into ſome ſhed, or covered place; where they may be kept, quite dry, and unexpoſed to the ſun and air. A calm day ſhould be choſen for the above purpoſes; as the aſhes, at firſt, are very light, and liable to be blown away, by a moderate wind. Thus burned and preſerved, they will be found an excellent hand-dreſſing, in the following ſpring, either for corn, or graſs land.—Immediately after the laſt hay-harveſt, I put out one of my fires, in order to make a trial upon ſome four parts of a meadow, betwixt theſe aſhes (ſet on quite warm), and ſoapers waſte. The former (in a great meaſure) deſtroyed the ruſhes, and other bad kinds of graſs; and, in their ſtead, produced great quantities of natural clover. When the cattle were turned into the aftermath, in the October following, they were ſo tempted with the ſweetneſs of the ground, where the aſhes were ſpread, that they eat it quite bare, long before any other part of the cloſe. The effects are ſtill very viſible; and will, I dare ſay, be ſo a long time. But I cannot expect ſo laſting an improvement from them, as from the ſoapers waſte; which is a noble and deſirable tillage; when to be procured upon moderate terms. But ſuch is the demand for it, in this neighbourhood, that they now ſell it at a ſhilling a buſhel.—They burn great quantities (I believe) of peat-aſhes in ſome parts of Berkſhire; and eſteem them (as I have heard) one of the beſt dreſſings for their ſpring crops.—I could wiſh ſome of your readers, who know the method

uſed

uſed there, both in burning, and preſerving them, would be ſo good, as to favour the public, with an accurate account of it, through the channel of your publication. Such an authority, might induce many to make uſe of ſo excellent a tillage, and procured too upon ſuch eaſy terms in many parts of the kingdom, who now intirely neglect it, for want of knowing its excellence, or the proper manner of procuring it.—As I am upon the ſubject of aſhes, I will beg leave to mention a very great improvement, that may be made (and at a moderate expence) with coal-aſhes; which, when properly preſerved, are alſo an excellent tillage. The beſt, indeed, of all others, in my opinion, as I ſhall mention hereafter from experience, for ſpeedily breaking, and improving black, mooriſh, or benty land.—The improvement is, putting a buſhel of lime, in its hotteſt ſtate, into every cart-load of coal-aſhes, when carried out upon the land; in order to be ſpread thereon; covering it up in the middle of the heap for about twelve hours, till the lime be intirely fallen; and then incorporating them well together, by turning them over two or three times: by which, the cinders, or half-burnt parts of the coals, which are noxious to the ground, inſtead of being uſeful, will be reduced to as fine a powder, as the lime itſelf.—I have obſerved before, that peat-aſhes ſhould be kept under a cover. The ſame injunction is quite as neceſſary, with regard to coal-aſhes: and the expence of building a *proper one*, would be very ſoon repaid, by the ſuperior quality of *ſuch aſhes*, over *thoſe*, that are expoſed to the weather.

I mentioned above, "that coal-aſhes were, in my opi-"nion, the quickeſt breakers, and improvers, of mooriſh, "and benty land."—This I have experienced upon ſome ground of that kind; which I mentioned to have drained, in a former letter, to you, gentlemen.—I had two pieces, that were very ſtrong and ſtiff with heath roots and benty graſs, which were broken up about the middle of laſt June. Upon one of them, I ſet lime only in the quantity of two hundred buſhels to an acre. Upon the other, I laid a moderate covering of coal-aſhes, mixed with a

ſmall quantity of lime. On ſtirring thoſe two pieces about a month ago, in order to have them laid down with barley and graſs-ſeeds, I found the former altered conſiderably, but ſtill rather untractable, and requiring a good deal of breaking with the harrow, in order to bring it into a tolerable good tilth; but the latter, as fine and mouldy, as a well-cultivated garden; and requiring no other breaking, than that of a few thorns drawn over it, juſt to cover the ſeed.

Mr. Comber, in the next number of the ſame volume, with much reaſon, recommends the planting of the great maple, commonly called the ſycamore: as it will certainly grow very well in many ſoils, which are too dry for moſt of the other kinds of foreſt-trees: and will alſo ſoon arrive at a large ſize.—He is much pleaſed with the produce of his own; and thinks it unparallelled. But I have ſold, and known ſold, trees, ſhort in age of his, for more money: and yet they were of the vulgar kind; and could boaſt no noble deſcent, "*around their heads no lineal* "*glories ſhone.*" As to the circumſtance of the poor *blind mole's elevation and cruel fate*, it is certainly a *moſt extraordinary one*; and I wiſh, with *that gentleman*, that ſome of your correſpondents, who are connected with the Royal Society, would favour us with an explication of that ſurpriſing phænomenon: if any gentleman, of that learned and reſpectable body, will condeſcend to treat upon ſo *humble a ſubject*. If not, poſſibly, ſhould *you*, *gentlemen*, *deſire it*, I may offer my conjectures, corroborated with an almoſt parallel ſtory, which I had ſome years ſince, from a very worthy gentleman, who in his younger age *had travelled*.

I am, GENTLEMEN,

Your conſtant reader,

Lancaſhire, and humble ſervant,

April 18, 1766. R. T.

P. S. You, gentlemen, receive this upon the ſame terms as the laſt, to amend, alter, prune, or obliviate, the whole, or any part, as moſt conducive, in your eſtimation, to your uſeful plan.—Vanity, in any literary performance,

formance, is disagreeable. In yours, solely calculated for the public good, insufferable and disgusting.—I wish a *certain* gentleman may not have been so to some of your readers and admirers.—If that *foible*, and an *improper warmth* and *petulency* of temper, could be corrected with *lenitives*, his zeal and activity might be very useful.—He means well, but is too hasty in conclusions, and impatient at the shadow of a contradiction to his *ipse dixit*.—This postscript is intirely to you, gentlemen editors, who will, I hope, excuse it, as it is truth, and proceeds *only* from my good wishes to your undertaking—for the gentleman, I hint at, never offended me, nor was ever known by me, but by his writings in your publication.

NUMBER XLIX.

Observations on the Profits of grazing or feeding Cattle; tending to shew, the little Advantages accruing therefrom, under the present Circumstances: And exemplified by a particular Account, and Estimate of the Expences, and Return, of feeding horned Cattle, with Oil-Cakes.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

MANY of the farmers in this county, having fattened large cattle for the London market, with oil-cakes, I have collected the following particulars, from one of them, who is very sensible, for the benefit of such of your readers, as may be inclinable to try the experiment of this kind of feed: and in order to free the graziers from the accusation of their enhancing the price of meat; and to obviate the bad consequences of partial representations.

Cattle were at so high a price last year, from Midsummer, in all the fairs in this part of the kingdom, that, though we had scarce any grass, and a very indifferent crop of turneps, a steer, of any moderate size, was bought in at one pound more than he was really worth; and when sold at the present price, did not, therefore, pay the grazier for any contingency in the course of fattening him,

nor

nor even for his trouble and labour, allowing nothing for his hazard.

In ſuch a ſeaſon, oil-cakes were much made uſe off, as the quickeſt, ſureſt, and cheapeſt method, of fattening the large ſhort-horned cattle, called Yorkſhire wolds; which were of too weighty a ſize for any but the London market. Theſe cattle, according to their bulk, were bought in at the price of from ſeven pounds, to twelve pounds *per* bullock, (ſome indeed at a higher price). The oil-cakes were at firſt, bought at the price of five pounds, and roſe afterwards to ſix pounds *per* thouſand. One thouſand five hundred cakes are a good waggon load, if to be carried two miles from the mill; and two ſuch loads are a good winter day's work. One thouſand of theſe cakes were thought ſufficient to fatten a ſteer, the original price of which, was ſeven pounds. But it was found, that near one thouſand two hundred would have been proper to have fattened him compleatly. Such a ſteer, had two pecks and a quarter of the oil-cakes *per* day, at three quarters af a peck at a time; (one cake fills a quarter) five pails of water *per* day at twice watering; and ſtraw or rather hay at night. With all theſe expences, my friend's account ſtands thus:

Cr.	*l.*	*s.*	*d.*
By 7 ſteers at 7*l.* *per* ſteer - - -	49	0	0
By 7000 cakes at 5*l.* 5*s.* *per* thouſand - - -	36	15	0
By one month's graſs, before ſtalling for the cakes, at 1*s.* 6*d.* *per* ſteer *per* week -	2	2	0
By driving to London market at 5*s.* *per* ſteer - -	1	15	0
	89	12	0

Dr.	*l.*	*s.*	*d.*
By 7 ſteers, bought at the ſame time, fattened upon an average up to 44½ ſcore *per* ſteer, and ſold at Smithfield, at different times and prices, the lateſt after full four months keeping - -	92	2	0
Deduct Cr.	89	12	0
Remain Dr.	2	10	0

The muck, from the above ſteers, is thought equal to the expence of carting home the cakes two miles; ſupplying them with ſtraw for night-food and litter; and for payment of a ſervant, at ſeven ſhillings *per* week, to attend them.

Some put the ſteers, to the cakes immediately, without turning them to graſs firſt. The beſt, in this neighbourhood, were treated ſo; ſheep, and hogs have been fattened with theſe cakes. They eat them greedily; but I have not learned, with what ſucceſs to the farmer.

To make this account, if uſeful at all, as much ſo as poſſible, I will conclude it with the contraſt of the expence, and advantage of five ſcots, and two ſpaved heifers, fed abroad on graſs, hay, and turneps, from laſt Auguſt to laſt March; and ſold to the village butcher for his country cuſtomers.

Cr.	*l.*	*s.*	*d.*
By 5 ſcots at 4*l.* 13*s.* *per* ſcot - -	23	5	0
By 2 heifers - -	8	17	0
By graſs at 1*s.* 6*d.* *per* week *per* bullock - - -	7	7	0
By four acres of turneps at 2*l.* *per* acre - - -	8	0	0
	47	9	0

Dr.	*l.*	*s.*	*d.*
By 7 ſcots fattened on an average to twenty-four and a half ſcore *per* bullock, bought and ſold together, the laſt taken away afterſeven months keeping - -	49	0	0
Deduct Cr.	47	9	0
Remain Dr.	1	11	0

The dung, from the above bullocks, is ſuppoſed equal to the value of the hay, they had every evening during winter; and to the expence of pulling, and carting the turneps to them. Small as the profit of theſe was, it muſt have been leſs, had not beef been in our country markets at five ſhillings and ten-pence *per* ſcore; and at this price, offal, tallow, and ſkin, perhaps excepted, the

butcher could only get, about a guinea by this lot, as appears from the following bill.

	l.	*s.*	*d.*
By ſale of 7 Scots, weight $24\frac{1}{2}$ ſcore *per* Scot, giving $171.\frac{1}{2}$ ſcore meat, at 5*s.* 10*d.* *per* ſcore	50	0	5
By purchaſe of ditto - - - - - - - - -	49	0	0
* Butcher's profit	1	0	5

Eſſex, Braintree,
April 26, 1766.

Yours, reſpectfully,
C.

NUMBER L.

Obſervations on the Injury done to Graſs-Land by Ants, or Piſmires; and on the Means of deſtroying them.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AMONGST all thoſe various ſubjects, that may be ſuppoſed, not improperly, to come within the plan of your *Muſeum*, I do not remember, that any mention has been made of that laborious, yet pernicious inſect, the

* This account of the expence and profit of the grazier and butcher, ſeems very candid and fairly ſtated: admitting the juſtneſs of it, the cauſe of the dearneſs of proviſions, is leſs to be imputed to the monopolizing practices, or exorbitant profits of graziers and dealers in cattle, than to the accidents of the laſt ſeaſon, and the general advance in the price of lean cattle and fodder. This ſhews the very great importance of the improvement of paſturage; particularly with reſpect to ſuch kinds of herbs or roots, as will ſtand all the rigour and extremities of froſt moiſture, heat, and drought: and reflects great honour to the Society for promoting arts, *&c.* whoſe laudable endeavours on this ſcore, have occaſioned many attempts, that ſeem to promiſe the moſt advantageous conſequences, reſpecting this momentous purſuit. A. O.

Piſmire. It lays waſte many pieces of land, forming thereon little barren hills, compoſed of ſmall particles of ſand, lightly, and artfully laid together, convenient for themſelves and their own ſocieties, but deſtructive to the lands of the farmer; deducting, from the valuable quantity thereof, as much as theſe *Habitatiunculæ* of their's cover; which may be often computed at a tenth part, or more of his uſeful graſs-lands. Nay, in ſome places, where negligence has ſuffered them to multiply, almoſt half has been rendered uſeleſs: the hills ſtanding as thick together, as graſs-cocks in hay time: and, what is moſt ſurpriſing, this indolence of their's is defended, by affirming, that the area or ſuperficies of their land is hereby increaſed: whereas it is well known, by the induſtrious, that very little or no graſs, ever grows thereon; and that, therefore, though the ſurface be increaſed, the produce is proportionally decreaſed. As to the methods of deſtroying theſe inſects, I have not known any ſufficiently effectual; and therefore write this

Ut fungar vice cotis; acutum
Reddere quæ ferrum valet, exſors ipſa ſecandi.

to excite ſome perſon who has had experience herein, to communicate his methods and ſucceſs to the public. It has been a cuſtom in many places at the beginning of winter, and often when the weather was not very cold, to dig up the ant-hills, three or four inches below the ſurface of the ground; and then to cut them in pieces, and throw them about. But this only diſſeminates them, as it were; and does not deſtroy them; they can hide themſelves amongſt thé roots of the graſs for the preſent; and then collect themſelves together again upon any little eminency, of which there are great numbers ready for their purpoſe, *viz.* the circular ridges round the hollows, where the hills ſtood, as is very ſoon viſible to any curious obſerver. Now as ants, bees, waſps, and various ſorts of inſects and animals, are ſo very tenatious of their *Nidus's*, as not to be

eaſily

eaſily driven from thence, I thought it proper to cut off the hills entire, and even with the ſurface; and to let them lie whole, at a little diſtance, with the bottom upwards: that the ants continuing in their habitations, the rains might run into thoſe holes of communication, (which may be ſeen as large as the hollow of a quill, and very numerous in the place where the hill was taken from, as likewiſe in the hill itſelf reverſed); or that the froſts might ſooner penetrate into their dwellings; and deſtroy them. Perhaps a little ſoot, ſown upon the places; and waſhed in with the rain might have a better effect. The hills, when made mellow by the froſts, may be broken and diſperſed about on the land. What is here ſaid is chiefly upon theory; and what I have begun only the laſt winter to try by experiments: which, if ſucceſsful, may perhaps be communicated in another paper. The cutting the hills even with the ſurface, has one advantage: that it leaves the paſture-land even and fit for mowing; has a better view, and more agreeable appearance; and, the little eminences being taken away, the inſects are more expoſed to the wet: which is diſagreeable to them.

There is another caſe, with reſpect to theſe inſects, which I have made trial of more effectually, in the wet ſummer, 1764.

In wet weather theſe inſects accumulate cavernous heaps of ſandy particles amongſt the graſs, called by the labourers, ſprout-hills; which quickly take off the edge of a ſcythe. Theſe hills, which are very light and compreſſible, I have cauſed to be ſtamped down, with the feet of the hay-makers, after trial firſt made by myſelf; and find, that theſe inſects, eggs, and earth, may be eaſily pounded to a mortar: which ſhould be repeated a ſecond or third time, after the itinerant foragers are returned from their queſt of food; and have begun to raiſe new ſtructures, near the old demoliſhed habitations.

I propoſe for the future, if there happen again to be great numbers of them, where the experiment has not been made, to make it one perſon's buſineſs, to pound their bodies

bodies and eggs together into one common mucilage. One perſon may be employed with a rammer, to follow five or ſix mowers, when there happens to be a wet ſummer; and beat them all down immediately level with the ground: and to do the ſame over again along with the hay-makers, that if any eſcape, or begin again to form ſocieties, they may be effectually extirpated. I hope, that further experience will give us encouragement to purſue this method; and thereby very much to thin, if not totally deſtroy them.

What I have written is part from theory and part from practice, which I ſubmit to the conſideration of others, and would be glad to know their ſentiments, or methods if more ſpeedy or effectual for leſſening this inconvenience, by which they will oblige their's, and,

Milton, May 1, 1766.

Your humble ſervant,

W. R.

P. S. Soon after writing the above, I obſerved, that the ants, excited thereto by this ſhowery ſeaſon, have begun to collect, and heap together, ſmall particles of ſand amongſt the graſs: and that there are already great numbers of eggs depoſited within the encreaſing hills. I have, therefore, without delay, ſent a man with a rammer to pound together all he could find; it being much eaſier and ſooner done when the hills are ſmall, than afterwards: and may probably very much diminiſh, if not totally prevent the labour of pounding them together when the graſs is mown.

May the 5th.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS I am a friend to your uſeful undertaking, I am willing to throw in my mite towards advancing the ends of it; and, I think, I cannot do this more effectually, than by publiſhing, through the channel of your paper, the reſult of ſome experience, in the practice of drilling wheat: and this I am inclined to do for the following reaſon. There is ſomething ſo very plauſible *, and in-

* There is no undetermined queſtion of greater conſequence to agriculture than, "*Whether the drill or broad-caſt method of "culture, be moſt profitable in general, or under particular circum-"ſtances, for corn.*" This queſtion, therefore, is of too much moment to reſt on it any hypotheſis relating to fertilizing principles, *&c.* and it is with pleaſure, we ſee meaſures taken for the deciding it by facts.

We call it an undetermined queſtion, becauſe, in our laſt account, we publiſhed an eſtimate, made by Mr. Wynne Baker, of the comparative advantages of theſe methods, founded on the *data* afforded by the reſult of actual experiments, tending to prove, by clear calculations, that the drill method has a moſt manifeſt and conſiderable ſuperiority over the broad-caſt: and now, on the other hand, we inſert another eſtimate, apparently founded on facts of valid authority, which, if admitted, renders the contrary equally evident: as ſhewing the drill method is attended with loſs, when compared with the beſt broad-caſt.

This leaves us in the utmoſt degree of doubt, as far as we reſt our opinion on theſe two accounts: and yet the intereſting nature of the queſtion calls for an elucidation. The broad-caſt is the old, and almoſt univerſal, practice at preſent: the drill method is a propoſed improvement, not yet introduced, but in a very ſmall degree: but which is yet big with ſo many benefits, if the allegations made by the advocates for it be true, that we ought not readily to admit of opinions to its diſcouragement. It is not the greater produce of this method, in proportion to the expence, which makes the principal object: but it is, that labour ſupplies in it the place of manure, and fallow; and thus that limitation of the improvement of land is taken away, which attends on the uſe of dung: and the whole quantity of arable ground, is virtually increaſed, by avoiding the temporary waſte of fallow: conſiderations, which, on the moſt moderate computation,

deed rational, in the arguments for this method, drawn from the advantage of admitting the fertilizing principles of the atmoſphere, into the ſoil, by a perfect pulverization, that it is no wonder gentlemen are induced to take up a high opinion of the practice, by reading what the writers on this ſubject aſſert in favour of it. A partial calculation formed, not from particular experiments continued for a time adequate to the purpoſe, but from the produce of the firſt year of the drilled crop, where the ſoil is prepared by a whole ſummer's fallow, with exaggerated expences charged on one ſide, and ſuch as are much too ſmall, on the other, finiſhes the conviction; which the theory of the cœleſtial influences had prepared the mind to receive. The drill, and the plough, go to work.—The firſt crop, though not yet quite equal to the ſanguine expectations of the driller, is pretty good: and he ſows again with the notion, that this is to be increaſed next year, by the *melioration* of ſoil; which, as he has *read*, is the certain effect of this method of culture. Unluckily the ſecond crop is worſe than the firſt: and the ſucceeding crops prove, that, notwithſtanding the virtue of the hoe-plough, the land is advancing to the ſtate, which is diametrically oppoſite to that of melioration.

That this is a true hiſtory of drilling, is evident from a plain fact, open to the obſervation of all, *viz.* That this method is diſcontinued by all, who try it, in the courſe of a few years. This fact, I aſſert to be true, as far as my own obſervation, or intelligence, reaches; except in one inſtance: which is, that of a gentleman near Reading (Sir H. B. *) But whatever becomes of this one inſtance,

computation, exhibit a very great gain to the public. The advantages of ſubſtituting labour for manure, we before touched on, in a note on Mr. Ladner's letter, in our laſt number, page 235. R.

* If that gentleman does ſtill continue this practice with ſucceſs, (which I doubt), it would be a public ſervice, to inform his countrymen, by means of your *Muſeum*, of the particulars of his management, and the nature of his ſoil. *Inglor.*

the

the above-mentioned fact is certainly in general true: and the general truth of it is, an indiſputable proof, that the drill-huſbandry for wheat does not anſwer. For men do not diſcontinue methods of buſineſs, which they find profitable, to take up others, which they know to be leſs ſo. But I ſhould not have given you the trouble of peruſing this paper, if it were to contain only general obſervations. To come, therefore, to particular experiments, which ſeem to carry ſome information with them concerning the utility of drilling wheat, I have tried this method four years. In the firſt year I had twelve acres; which had been brought into very good order by proper tillage; and were well cultivated in this method, during the growth of the crop. The produce of theſe was twelve buſhels *per* acre.

In the ſecond year, I had thirty acres of drilled wheat, well prepared; and well hoed. The produce of theſe was nine buſhels and two-thirds *per* acre.

In the third year, I drilled twenty-four acres with wheat; which produced nine buſhels and a half *per* acre.

In the fourth year, I drilled eighteen acres with wheat; which produced ſeven buſhels and a half *per* acre.

From theſe crops, I preſume to conclude, that, from this land, ten buſhels *per* acre is the utmoſt that is to be expected by drilling; and, I muſt inform you, that, from the ſame land, in the ordinary courſe of huſbandry, I have twenty buſhels on a tilth-acre of wheat: and, in a tolerable ſeaſon, four quarters of oats after wheat. Theſe crops, I mention as ſome of the *data* neceſſary for the forming a calculation to determine the reſpective advantages of the common courſe of huſbandry, and of the uncommon one by drilling. For which calculation the following *data* are, likewiſe, neceſſary.

1. At an average, fifteen buſhels of wheat comes from a load of ſtraw.—This wheat, at four ſhillings *per* buſhel, is worth three pounds: and the load of ſtraw is worth one pound. So the ſtraw is, to the wheat, in value, as one to three.

2. Four quarters of oats generally come from two loads of ſtraw. Theſe oats, at an average, are worth three pounds (at fifteen ſhillings *per* quarter): and theſe two loads of ſtraw are worth one pound. So here, alſo, the ſtraw to the grain is, as one to three.

3. One load of clover-hay *per* acre is a moderate crop. Three are ſometimes got. But I do not put it higher: as I charge nothing for aſhes to dreſs the clover.

4. The price of ploughing an acre, I put at ten ſhillings: which is ſomewhat above the ordinary price. But, I am certain, that, according to the preſent price of horſes, horſe-meat, labour, and farm-utenſils, the farmer, whoſe team does not earn ten ſhillings a day, when they do work, is not paid for his team.

5. A drilled acre may be conſidered as being ploughed four times in the year. The intervals ſhould be ploughed twice after harveſt.—This is equal to one ploughing of the whole field. Then the new ridges are formed by ploughing the whole land: and during the growth of the crop, the four hoeings are equal to two ploughings of the whole field. The ſpeculative driller will object here; and ſay,—I hoe with two horſes, you plough with four in the ordinary way. Therefore, two of my hoeings are not equal in expence to one of your ploughings. I anſwer,—Two horſes are not ſufficient for hoeing.—If the land be at all ſtrong, it will require three horſes: and whether the fourth horſe (which you muſt have to plough your ground properly after harveſt) lye ſtill, or not, makes very little difference in your expence.

The other articles in the calculation, being at the known prices within thirty miles of London, we will now proceed to the *criterion* of the two methods, by comparing the expences, and the produce of each of them.

Farmer *A.* has forty-five acres of arable; which he diſpoſes into five portions. He has every year nine acres fallow: nine in tilth wheat: nine with oats, and clover-ſeed ſown among them: nine under clover: and nine under lay-wheat; *i. e.* wheat ſown on the back of his clover-

lay.

lay. His land is at ten ſhillings *per* acre rent. What then are his expences on the ſixty-five acres? His expences on his ſeveral crops will ſtand thus:

Expences for nine Acres of Tilth Wheat.

	l.	*s.*	*d.*
Four ploughings to prepare, and one to ſow the land	22	10	0
Seed-wheat, two buſhels and one-eighth *per* acre, nearly	4	0	0
Rent for two years	9	0	0
Carting and ſpreading dung, about	5	0	0
Reaping, at ſix ſhillings *per* acre	2	14	0
	43	4	0

Expences on nine Acres of Oats.

One ploughing	4	10	0
Seed, four buſhels *per* acre, at two ſhillings *per* buſhel	3	12	0
Harrowing	1	2	6
Clover-ſeed, three ſhillings *per* acre	1	7	0
Rent	4	10	0
Mowing and raking, at two ſhillings *per* acre	0	18	0
	15	19	6

Expences on nine Acres of Clover.

Mowing and making, at ſix ſhillings *per* acre	2	14	0
Rent	4	10	0
	7	4	0

Expences on nine Acres of Lay-Wheat.	*l.*	*s.*	*d.*
One ploughing	4	10	0
Seed-wheat, two buſhels and a half *per* acre	4	10	0
Harrowing	1	2	6
Reaping, at ſix ſhillings *per* acre	2	14	0
Rent	4	10	0
	17	6	6

Thus the totals of the expences, on theſe forty-five acres of Farmer *A.* are,

On his tilth-wheat crop	43	4	0
On his oat crop	15	19	6
On his clover crop	7	4	0
On his lay-wheat crop	17	6	6
	83	14	0

The produce of theſe forty-five acres ſtands thus:

The tilth-wheat, one hundred and eighty buſhels, at four ſhillings *per* buſhel (twenty buſhels *per* acre)	36	0	0
The ſtraw from this crop	12	0	0
Nine acres of oats give thirty-ſix quarters, which at fifteen ſhillings *per* quarter	27	0	0
The ſtraw from the oat crop	9	0	0
Nine acres of clover give nine loads of hay, which at forty ſhillings *per* load	18	0	0
Nine acres of lay-wheat give one hundred and thirty-five buſhels, at fifteen buſhels *per* acre; theſe, at four ſhillings *per* buſhel, are	27	0	0
The ſtraw of this crop	9	0	0
Total of the produce of the forty-five acres	138	0	0

Farmer

Farmer *D.* drills forty-five acres with wheat every year. I will ſuppoſe his land got into drilling order; and charge nothing for that: as it is an expence of only the *firſt* year. Though by the way, a *heavy* one for that year. But, however, I will take only the annual expence incurred every year after the *firſt*. With this advantage given to him, Farmer *D.*'s account will be this:

Expences on forty-five Acres of Drilled Wheat.

	l.	*s.*	*d.*
Four ploughings, as the work is before ſtated in *data*, five and four	90	0	0
Rent for one year	22	10	0
Seed wheat, forty-five buſhels, at four ſhillings *per* buſhel	9	0	0
Drilling and harrowing in, at one ſhilling *per* acre	2	5	0
Reaping, at five ſhillings *per* acre	11	5	0
Total expence on forty-five acres drilled	135	0	0

Produce of forty-five Drilled Acres.

Forty-five acres give four hundred and fifty buſhels, which, at four ſhillings *per* buſhel, are	90	0	0
The ſtraw of this crop	30	0	0
Total produce of forty-five acres of drilled wheat	120	0	0

Now take from	135	0	0
	120	0	0
And the remainder ſhews, that Farmer *D. loſes* annually, by his forty-five drilled acres	15	0	0

From

	l.	s.	d.
From Farmer *A.*'s produce	138	0	0
Take his expence	83	14	0
The remainder ſhews, that Farmer *A. gains* fifty-four pounds ſix ſhillings by forty-five acres, in the common courſe of huſbandry	54	6	0
The advantage conſequently is, on the ſide of the common huſbandry, againſt drilling, on forty-five acres, annually	54	6	0
	15	0	0
	69	6	0

But it may be ſaid, and with truth too, Farmer *A.* charges nothing for manure; which he cannot avoid uſing, when he fallows for wheat:—or, if he does omit the uſe of it, he will not have the crops here ſuppoſed. This is a charge upon him, which is not upon Farmer *D.* For he, by conſtant ploughing, can get his crop without manure. This article muſt, therefore, be valued: and the amount of it, deducted from the profit of the common huſbandry.

In order to this, it is allowed, that twelve loads of dung muſt be laid upon every one of the nine acres fallowed for wheat. The value of a load of dung may fairly be put at five ſhillings: conſequently twelve loads at three pounds: and, as the manure on an acre is worth three pounds, that, on nine acres, will be worth twenty-ſeven pounds. This ſum being deducted from the profits of the common farmer, the advantage of his method, above that of drilling, will be twenty-ſeven pounds leſs than before ſtated, *viz.*

	69	6	0
	27	0	0
On forty-five acres annually	42	6	0

And

And this annual difference, in the net profits, arising from these two different methods, seems a decisive proof, that the method of culture by drilling is hurtful to the farmer *, who practises it; as lessening his profit: and, to

* As the question above stated, relating to the comparison of the drill and broad-cast methods, is so highly important, and embarrassed with so much doubt, it is very material to inquire in what the doubt seems to lye: as the only means of clearing it up is, to reduce the dispute to some stated points of difference, to be determined, as far as it depends on facts, by future experiments.

In examining the matter in this light, we shall soon find, that the great and essential difference betwixt Mr. Baker, and the worthy writer of this letter, consists in this particular, that Mr. Baker has presumed, *land, cultivated by the drill method, will produce at least equally good crops, for a succession of fifteen years or more:* and our present correspondent, on the contrary, *denies this:* and founds his calculation, and deductions, on the *opposite supposition*. It must be allowed, indeed, that the two gentlemen proceed on different systems of the broad-cast tillage: Mr. Baker taking an alternation of wheat, and oats, with a third year's fallow: and the other taking the succession of tilth-wheat, oats, clover, and lay-wheat, with a fifth year's fallow: which is, most probably, a more profitable mode. This makes a difference in the particular articles of expence and produce. But it will appear, on close examination, the essential difference resides in the allowing, or disallowing, that the produce, or crops, in the drill culture, will not fail after the first year; but may be rated as the same for a long term.

In this particular the two accounts are intirely opposite. Mr. Baker states, in his account, the produce of a drilled acre of wheat, at six barrels *per* year, for fifteen successive years: and says, in the postscript of his letter, "For the encouragement of "such of your readers, as are willing to enter into the drill "husbandry, I cannot omit to inform you, that I now have a "field *under wheat in drill*, which *surpasses* any corn *I ever saw in* "*my life*, at this season: and it is the *third drilled crop*, which has "been upon the ground *in succession*." Our present correspondent, on the contrary, here says, "That the first crop, though not "quite equal to the sanguine expectations of the driller, is pretty "good: and he sows again with the notion, that this is to be "increased next year, by the melioration of soil, which he has "read is the certain effect of this method of culture. Unluckily "his second crop is worse than the first: and the successive crops "prove, that notwithstanding the virtue of the horse-plough,

"the

to the public, as leſſening the produce of the land; and conſequently raiſing the price of all proviſions.

I am ſenſible, that the detail, which the compariſon of the two methods of culture has drawn me into, will appear minute to thoſe who read for mere amuſement. But I do not write to them: but to thoſe, who want information,—and to convey this, I apprehend, I cannot treat the ſubject too minutely.—For the knowledge of any thing can be acquired only by the knowledge of the minute parts of it.

I could give ſome tolerable reaſons, why drilling wheat, (for to this grain I confine my preſent argument) does not anſwer in the manner, in which the writers on this new ſyſtem flatter us it will: but having been too long already, I content myſelf at preſent with having proved, that in fact it does not anſwer.

" the land is advancing to the ſtate, that is diametrically oppo-
" ſite to that *of melioration.*"

He afterwards ſays, he has tryed this method four years; and verifies, by the ſpecified produce, the truth of the poſition.

It appears, therefore, that the great difference in the ſtate of facts, betwixt Mr. Baker, and our preſent correſpondent, is in this particular *of the crops continuing to be the ſame in the drill culture for a long ſucceſſion of years:* or failing after the firſt year. This, conſequently, makes the fundamental queſtion, that remains to be decided by further experiments. For neither of theſe accounts, ought to be queſtioned, with reſpect to the veracity of the relators: nor do indeed reflect any improbability on each other: as both are only narratives of ſingle trials, for a ſmall number of years; and nothing is more common than to have variations of this kind, from many contingent circumſtances of ſoil, ſeaſon, and management, not ſufficiently obſervable to ſtrike the attention, ſo as to gain a place in the relation. It is perhaps a lucky circumſtance for the clearing up this matter, that theſe two accounts, ſo ſeemingly extraordinary, happen to come both to our hands at almoſt the ſame time: as we hope it will incite ſuch trials, obſervations, and communications, relative to this point, as will be fully ſatisfactory; and either eſtabliſh the practice of drilling; or evince its unprofitableneſs; and turn that application, which is now beſtowed on it, by the zealous improvers of agriculture, to more ſucceſsful purſuits. N. O.

I muſt, however, before I conclude, touch on one matter, which ſeems of great conſequence to the improvement of agriculture in this kingdom: I ſee, by the public papers, that the Society of Arts, *&c.* annually give premiums, ſome honorary, ſome lucrative, to thoſe, who excell in different branches of agriculture. To one, for the beſt method of cultivating wheat; to another, for the beſt method of cultivating barley: and ſo on. A very laudable practice, undoubtedly; and worthy of that patriotic Society.

But I cannot help obſerving, that the benevolent intentions of the Society do not produce, in this inſtance, one thouſandth part of the good, which they would do, for want of the *publication* of theſe excellent methods. Were ſuch a publication made, either in your work, or in any other way, which the Society may like better, the improvement made by a gentleman in Yorkſhire, would reach to every part of the kingdom; whereas, by not being publiſhed, the benefit of theſe improvements is confined to a circle of a few miles round the ſpot, where they are made.

This evil is ſo inconſiſtent with the views of the Society *, that I cannot doubt, they will readily conſent to the plain remedy; *viz.* the publication of theſe improved methods, in any branch of agriculture, which they deem

* It would, undoubtedly, contribute greatly to the rendering the views of the Society effectual, that all theſe accounts ſhould be publiſhed at large in our collection: as being the only work, at preſent on foot, proper to receive them. In default of that, there remains no method; but to inſert them in ſome news-paper: which, beſides the not anſwering the end, may ſeem diſagreeable to gentlemen, as far as regards the ſignature of their name: a matter nevertheleſs of conſequence to ſtamp the authenticity and credit, that may give them their fulleſt influence. As to ourſelves, our regard to the Society, as well as the public, will diſpoſe us to receive with pleaſure all ſuch pieces, whenever the gentleman, in whoſe diſpoſal they are, will favour us with them: and certainly every member of the Society, who is actuated by the true ſpirit of its inſtitution, muſt approve of ſuch a ſtep: as both the credit of the Society itſelf, and the end of the premium, cannot fail to be promoted by it. E. O.

worthy of being honoured or rewarded: nor can I imagine, that the gentlemen, who have made theſe improvements, and delivered in their accounts of them, would heſitate, or make the leaſt objection againſt furniſhing you with copies of them, to be laid before the public. Sure I am, that the advancement of agriculture can never be promoted to a conſiderable degree, by any beſt-improved methods, of executing any part of it, while thoſe methods, are unpubliſhed. In this ſtate, they are a light hidden under a buſhel. The farmers are much obliged * to you, and Mr. Baldwin, for the account of his burnet-graſs. That gentleman would oblige them ſtill more, if he would take the trouble of informing them, by what manure, and what tillage, he prepared his ground for this graſs: and what ſort of produce his *ſown* burnet gives this year. For, as to tranſplanting graſs, our labourers in the country can never be perſuaded to go about it: and when they would finiſh a field of it, is hard to gueſs. But we ſhould be thankful for this graſs in ſpring, if it can be raiſed by field-culture: that is, by ſowing it; and harrowing it in.

I am, GENTLEMEN,

May 9, 1766. Your obedient ſervant,

INGLORIUS.

P. S. Before I make up this packet, I will add;

1ſt. With regard to the price of ploughing above ſtated, *viz.* ten ſhillings *per* acre, that, I am very clear, my own ploughing coſts me as much: and, moreover, that every farmer's team muſt gain him ſo much a day, *in that part of the year, in which this work is chiefly to be done*; if he is

* We preſume, from ſome reaſonable ground of conjecture, not however from information, or any authority from him, that Mr. Baldwin's account of burnet, though very intereſting, is but a ſmall part of the obligation of this kind, which the public has to him. We agree intirely with Inglorius, in his notion of the utility of this requeſt, of a more minute account of the culture; as the experience is of a later date than the publication of Mr. Rocque's pamphlet; and, doubtleſs, may have furniſhed ſome lights of the management of this plant, that may accommodate it ſtill more to the purpoſes of farmers.

to be paid for it what it coſts him. But, to cut off any objection from this circumſtance, I will ſuppoſe ploughing an acre coſts but ſix ſhillings. On this ſuppoſition, the article of ploughing, in the forty-five drilled acres, will be reduced from 90*l.* to 54*l.* For 10*s.* : 90*l.* : : 6*s.* : 54*l.* And the article of ploughing, in the forty-five acres, managed by common-huſbandry, will be reduced, from 31*l.* 10*s.* to 18*l.* 18*s.* For 10*s.* : 31*l.* 10*s.* : : 6*s.* : 18*l.* 18*s.*

Thus the expence, on forty-five drilled acres,	*l.*	*s.*	*d.*
is reduced from - - - - - - - - -	90	0	0
To - - - - - -	54	0	0
And the ſaving is -	36	0	0
And the expence, on the other forty-five acres,			
is reduced from - - - - - - - - -	31	10	0
To - - - - - -	18	18	0
And the ſaving here is only -	12	12	0
There is, therefore, a greater ſaving in the drilled			
method - - - - - - - - - - - - - -	36	0	0
compared with the other -	12	0	0
by -	23	8	0
Now, if from the difference of the profits of the			
two methods ſtated above, *viz.* - - - - -	42	6	0
We deduct this difference ariſing from changing			
the price of ploughing, in favour of the drilling			
method, *viz.* - - - - - - - - - - -	23	8	0
The remainder ſhews the difference - - -	18	18	0

ſtill remaining between the *annual* profits of the two methods: which, though conſiderably reduced, by this ſuppoſition, is yet fully ſufficient to convince us, which of the methods is beſt worth practiſing.

2. I would obſerve, that as the crops, ſtated above, are truly ſtated from actual experience on my land, a ſuppoſition of better ſoil will not operate in favour of drilling. For the other crops will be proportionably increaſed with

the drilled crop. But the ſuppoſition of a worſe ſoil will operate againſt the driller, more than againſt the common farmer. For a very poor ſoil may do ſomething with manure; but can do very little indeed without it: and this the driller does not uſe.

NUMBER LI.

An Account of the Nature, and Uſe of the Nonſuch *or* Hop Trefoil; *and of the Manner in which it is cultivated in* Suſſex.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

SINCE none of my ſouthern neighbours have given themſelves the trouble of ſatisfying the laudable inquiſitiveneſs of ſome of your correſpondents, relating to the culture and uſe of the *ſtrawberry trefoil*; in return for the pleaſure and improvement, I have received from many of them, I offer this for your and their ſervice. I always thought your plan a very uſeful one, as being a means of communicating the knowledge of experiments and improvements to the public: and ſome late imperfect hints * on the ſtrawberry trefoil, among other things, confirm my

* The ſtrawberry trefoil is a plant not generally known; and, as it appears, is very likely to be confounded with other trefoils, particularly the hop trefoil. There has been, undoubtedly, among our correſpondents, ſome miſtakes of this kind. It is not indeed to be wondered at, for Gerard Parkinſon, and the former writers, who were frequently very indiſtinct in ſuch matters, calling different plants by theſe names, and conſidered them all as exoticks, and particularly ſo in this. Mechanicus, who ſeems not to have had any lights in theſe points, but his own conjectures, has ſuppoſed the hop trefoil, and ſtrawberry trefoils, to be the ſame: and ingeniouſly accounts for the two names, from the appearances of the plant. But there are two very different ſpecies of trefoil diſtinguiſhed at preſent by theſe names of hop and ſtrawberry: and the kind which Mechanicus has collected, is

my opinion of the utility of your work: as it affords an opportunity for any perſon to publiſh the cultivation of a plant, ſo little known, as that ſeems to be in many parts of this kingdom. I conclude, the Rev. Mr. Comber believes it to be cultivated: elſe he would ſcarce have deſired *further* information on that head. But it is clear, it is not cultivated in Ireland: elſe Mr. Wynne Baker muſt have known it. And Mechanicus, in your laſt Number, calls it a very extraordinary, and little-noticed plant: and puts himſelf to the trouble of beginning its cultivation, by collecting a ſingle ounce of ſeed from wild plants of the ſame ſort. From ſome other circumſtances, likewiſe, I am inclined to think, its cultivation is confined to the ſouth part of the iſland: and, for ought I know, to but a ſmall part of the ſouth. Be that as it may, I am now to inform you, that it has been cultivated in Suſſex, particularly on or about the South Downes, for upwards of forty years paſt.

In what particular ſpot it began to be cultivated, I cannot tell: but the fact is, that, for many years paſt, many hundred acres, I may ſay many thouſand acres of it, are ſowed every year: and as many buſhels of ſeed ſaved. You may imagine, therefore, it ſeemed as ſurprizing to me, and ſo it muſt to all my neighbours, to hear of an in-

is certainly the *hop trefoil*, and not the ſtrawberry: and it is a confirmation of it, that there is ſo much agreement betwixt this and the Suſſex *nonſuch*, as induces Mr. Davies to ſay here, that his deſcription of it is right. For the nonſuch is the hop trefoil, and not the ſtrawberry: and ſo Mr. Miller has very properly made it. This is not the plant, therefore, inquired after, and deſcribed, by Mr. Baker, which is certainly the ſtrawberry trefoil. But it is, nevertheleſs, a very uſeful plant, as Mr. Davies's account proves; though one not known in general: and, therefore, the miſtake is perhaps productive of a more important information to the public, than could have reſulted from the moſt minute intelligence, with reſpect to the original object of inquiry: as it has occaſioned Mr. Davies to give this very clear, ſatisfactory, and intereſting detail of the nature and uſes of the *nonſuch*; and that manner of cultivation of it, which long experience has ſhewn to be profitable in his neighbourhood. R.

quiſitive

quiſitive gentleman's collecting an ounce of this ſeed for experiment ſake, as it would to him, had I offered to procure him a ton or two of the ſame ſeed, while he was gathering his ounce. I am far from meaning, to depreciate the merits of Mechanicus, or any other perſon, in making trials in huſbandry, of articles uncultivated hitherto: but am only arguing, from a fact, the neceſſity of having a means proper to communicate obſervations already made from one corner of the kingdom to the other. By ſuch means, the inquiſitive and ingenious will be directed in the choice of ſubjects for obſervation: and, by ſuch means, others will be benefited by them. But to the point.

I believe Mechanicus is right, as to the deſcription of this plant: though Miller diſtinguiſhes between the hop * and ſtrawberry trefoil; perhaps owing to different authors

* Mr. Miller's accounts of theſe two plants is very juſt, and agreeable to the preſent diſtinction and uſe of theſe names. In order, therefore, that thoſe of our future correſpondents, who may not be accurate botaniſts, may be intelligible to each other, on this ſubject, we have given them here.

Of the hop trefoil, Mr. Miller mentions two kinds. The firſt of theſe, which he has made number 3, of the *trifoliums*, he calls, "*Trifolium ſpicis ovalibus imbricatis, vexillis deflexis perſiſtentibus, calycibus nudis, caule erecto. Flor. Suec.* 617. Trefoil with oval imbricated ſpikes of flowers, having deflexed permanent ſtandards, naked empalements, and an erect ſtalk. This is the "*Trifolium pratenſe luteum, capitulo lapuli vel agrarium.* C. B. P. "Yellow Meadow Trefoil, or Hop Clover." The ſecond kind, which is his number 4, he calls, "*Trifolium ſpicis imbricatis, vexillis deflexis perſiſtentibus, calycibus pedicillatis, caulibus procumbentibus. Lin. Sp. Plant.* 773. Trefoil with imbricated ſpikes of flowers, having deflexed permanent ſtandards, empalements ſtanding upon foot-ſtalks, and trailing ſtalks. This is the *Trifolium luteum, lupulinum, minimum. Hiſt. Ox.* 2. 142. "The leaſt Yellow Hop Trefoil, called Nonſuch, or Black-ſeed." His further account of them is, "The firſt ſort grows naturally among the graſs, in moſt of the upland paſtures in this country; but the ſeeds are frequently ſold in the ſhops by the title of Hop Clover: and are, by many people, mixed with the other ſorts of clover, and graſs ſeeds, for laying down ground to paſture: this grows with upright branching ſtalks, about a foot high; which are garniſhed with trifoliate leaves,

thors ſeeing the ſame plant on different ſoils. The name, by which this plant is known to our farmers is *Nonſuch*.

And

" leaves, whoſe lobes are oblong, and heart-ſhaped, but reverſed: the narrow point joining the foot ſtalks. The flowers grow from the wings of the ſtalk upon long foot-ſtalks. They are collected into oval imbricated heads; they are yellow, and have naked empalements, lying over each other, like ſcales, ſomewhat like the flowers of hops, from whence this plant had the title of hop-clover. But there are two ſorts of this, which grow naturally in *England*. The other, (*which is the number* 4, *of his trifoliums*,) is a much ſmaller plant than this, and has trailing ſtalks. The heads of the flowers are ſmaller; and the flowers are of a deeper yellow colour. Theſe are not abiding plants, ſo are by no means to be ſown, where the ground is deſigned to continue in paſture; but, in ſuch places, where one or two crops only are taken, and the land is ploughed again for corn, it may do well enough when it is mixed with other ſeeds, though the cattle are not very fond of it green, unleſs when it is very young. The large ſort is the moſt profitable, but this is rarely to be had without a mixture of the ſmall kind; and alſo of the ſmaller melilot. It is commonly called *Nonſuch*, or ſometimes *Black-ſeeds*. For thoſe, who ſave the ſeeds for ſale, are ſeldom curious enough to diſtinguiſh the ſorts; but where the beauty of the verdure is conſidered, there muſt not be any of the ſeeds ſown, becauſe their yellow heads of flowers are very unſightly among graſs; and if it is in gardens, where the graſs is conſtantly mowed, the flowers of theſe plants will come out, near the root, in ſuch cluſters, as to occaſion large unſightly yellow patches; and as the heads decay, they turn brown, and have a very diſagreeable appearance."

The *ſtrawberry trefoil* is the number 10, of his *trifoliums*, and called by him, " *Trifolium capitulis ſubrotundis, calycibus inflatis bidentatis reflexis, caulibus repentibus. Hort. Cliff.* 373. " Trefoil with roundiſh heads, reflexed bladder empalements with two teeth, and a creeping ſtalk. This is the *Trifolium fragiferum friſeum. C. B. P.* 329. Strawberry trefoil." His further account is, " That it grows naturally on arable land in many parts of *England*; and has trailing ſtalks which put out roots at their joints. The leaves ſtand upon long ſlender foot ſtalks; the lobes are roundiſh, and ſawed on their edges. The flowers are collected in roundiſh heads, ſtanding upon ſlender foot-ſtalks, which riſe from the wings of the ſtalks. Theſe have bladder empalements, which terminate in two teeth. When theſe lye on the ground, their globular heads,

" having

And it is cultivated, either with a view to ſave its ſeed for ſale; or, in order to be mowed green for hay. In both caſes, we ſow it in the ſpring with oats, or barley, in the *broad-caſt* way; juſt as we do clover.

" having a little bluſh of red on their upper ſide toward the ſun, " and their other part being white, they have a great reſem- " blance of ſtrawberries, and from thence it was titled ſtraw- " berry trefoil." He obſerves of this kind, and ſome of the others " that they are preſerved in gardens for variety."

Mr. North alſo, in his pamphlet on graſſes, ſpeaks of the *hop trefoil* as a cultivated plant in this manner. " The fifth ſort " of trefoil which is biennial, or lives but two years, produces " ſmall heads of yellow flowers. It goes by the names of *tre-* " *foil*, *nonſuch*, *black-ſeed*, and *hop clover*. The ſeeds are " yellow, but covered with black huſks: which is the reaſon " for calling it black-ſeed, and the heads, before the huſks " change black, are ſomething like hops. This graſs will " thrive in moſt kinds of ſoil, makes good early paſture, and, " when cut in full bloom, excellent hay. It is ſown in the " ſpring, upon corn harrowed, and rolled over as is directed " for broad clover. Twelve or fourteen pounds of clean ſeed, " is ſufficient for an acre: but if it is ſown in the hulls, a buſh- " el and a half or two buſhels ſhould be allowed. When this " graſs is deſigned for ſeed, it muſt be mown for hay not paſ- " tured in the ſpring, as is the method with broad-clover."

It is evident from hence, that the hop trefoil, and the ſtrawberry, are different ſpecies of plants, and that the hop trefoil, is the kind collected by Mechanicus; and cultivated in Suſſex, under the name of the *nonſuch*, according to Mr. Davies's very juſt and particular account.

It is equally evident alſo, that the plant, which Mr. Wynne Baker made his obſervations on, is the *ſtrawberry trefoil*; and that, as far as appears, it has not been hitherto cultivated as a graſs, for feeding cattle. Whether this neglect of it, has proceeded from its being unattended to, by the improvers of huſbandry in this way; from its not appearing to be profitable, on trials which may have been made; or from the difficulty of procuring a ſufficient quantity of ſeed, to admit of adequate experiments; we cannot take upon us to conjecture: but, from what Mr. Baker has obſerved of it, in his limited attempt to cultivate it, there ſeems a very ſufficient ground of preſumption in its favour, to declare that it merits a further examination. For it is certain nothing is of more importance to the improvement of paſturage, the preſent great national object, when the high price of fleſh meat is conſidered, than a minute and extenſive knowledge of the diſpoſitions and qualities of all thoſe herbs, which can be ſubſtitutes for graſs. E. O.

When

When we mean to ſave ſeed from a piece of nonſuch, we ſow about half a buſhel of clean ſeed, on an acre; and, after the corn is mowed, we generally feed it with ſheep in the autumn. But it muſt not be eat in too late, nor too cloſe; for fear of injuring the plants, which are often killed by this means. In July following, the ſeed will be ripe: which is known by the huſk, that contains the ſeeds, being black. It muſt not be ſuffered to grow too ripe: for, in that caſe, as well as after much rain, the ſeed will be very apt to ſhed. In ſuch a caſe, it is ſometimes thraſhed in the field, on a ſheet; and carried in, ſeparated from the haulm.

The ground is afterwards immediately broken up, and fallowed for wheat: as the nonſuch will grow no more that year: nor yield any profitable crop, if ſuffered to grow the next year. For which reaſon, it is never ſowed but for the ſake of one crop.

I ſcarcely need to obſerve, that there is no difference required, in the manner of its cultivation, when it is intended to be mowed for hay. It muſt be cut about the beginning of June, when it is in full bloom; and the ſeed has been formed on the ſtalks that bloomed firſt; that is, on thoſe nearer the ground. For nonſuch keeps on blowing, in different parts of the ſtalks, for a long while. It begins to blow about the latter end of April; and, as the ſtalk grows taller, it ſhoots out into branches; which keep on blowing, after the ſeed is formed, in thoſe that blew firſt. It is obſerved, that if it be cut too ſoon, though it will to appearance make very fine hay, cattle will not eat it, unleſs compelled by hunger: whereas, when it is cut in its proper time and maturity, and well made, cattle, even thoſe that are fatted, will eat it as readily, and do as well with it, as with any hay that is produced. And many of our Suſſex oxen, which are, I believe ſold for as much *per* ſtone as any that come to Smithfield, and for more than moſt of them, are fed either in part, or entirely with this hay.

There is another method, in which we cultivate nonſuch, and which is, indeed, the moſt common, when it is intended for hay and paſture. This method is, to ſow it, mixed with clover ſeed, of each an equal quantity; that is, about a peck of each to the acre. We find it beſt, not to be ſparing of ſeed: for the thicker the plants are on the ground, the ſmaller the ſtalks, and the finer the hay will be: conſequently the more valuable. The ſtalks of nonſuch, being much finer than clover, ſtill mend the hay on that principle alſo: which is one reaſon for mixing them. Another very material reaſon for ſowing theſe two ſeeds mixed, is, that, as the nonſuch does not grow again, when they have been mowed together for hay in June, the clover immediately after ſtarts up for a ſecond crop: which we ſave for ſeed, and mow about Michaelmas. The nonſuch, not growing then, leaves double room for the clover to grow, and ripen its ſeed; which it does the better, for not being too thick upon the ground.

We find it uſeful, alſo, when we ſow any ſaintfoin, to throw in about a gallon of nonſuch ſeed, into the ground along with that ſeed. By which means, we have a good crop of hay the firſt year: which is never to be expected, when ſaintfoin is ſown alone. And the nonſuch not growing after it is once mowed, leaves room for the ſaintfoin to branch out, and fill the ground, both for the after graſs, and for the ſucceeding crops.

The quantity of hay, nonſuch produces, is much the ſame, as that of clover: but it generally produces more ſeed. The price of the ſeed is commonly one-third leſs than that of clover ſeed, or thereabouts. I mean, that of clean ſeed, cleared of the black huſk, or *pug*, as we call it. It looks like clover ſeed: but is of a yellower hue, and is of the ſame ſize. Sometimes it is ſowed in the pug; and then four times the quantity muſt be uſed. For four buſhels of ſeed in the pug will generally yield one buſhel of clean ſeed.

The ſeed is cleared of its pug, by thraſhing it, with flails, on a barn-floor; in the ſame manner, as clover

ſeed

ſeed is cleanſed. It may be done, alſo, by a mill. The common price for cleaning ſeed, to our labourers, is about five ſhillings a buſhel.

Leaving you at liberty, as to the uſe you ſhall make of this account, I remain,

GENTLEMEN,

Glynd, near Lewes, May 10, 1766.

Your's, &c.
THO. DAVIES.

P. S. If I have omitted any thing, which Mr. Comber, or any other of your readers, may want to know, relating to this plant, or any other ſubject of cultivation within my knowledge, I ſhall be ready at any time to ſatisfy them to the beſt of my power. Though I am not a farmer by profeſſion, yet, as I live much among ſeveral intelligent farmers, and uſe a little land myſelf for health and pleaſure's ſake, I am pretty well acquainted with the general practice of farming in this part of the country.

NUMBER LII.

A Liſt of the Premiums offered for the Year 1766, *by the Society for the Encouragement of Arts, Manufactures, and Commerce.*

Premiums for Planting and Huſbandry.

ACORNS.

1. FOR ſetting or ſowing the greateſt quantity of land with acorns (twenty acres at leaſt) between the twentieth of September 1765, and the firſt of May 1766, and for fencing and preſerving the ſame effectually, in order to raiſe timber; a gold medal.

Certificates of ſetting or ſowing, agreeable to the above conditions (and that there are five hundred oak plants at leaſt on each acre) muſt be delivered to the Society on or before the firſt Tueſday in November 1766.

2. For the ſecond greateſt quantity of land, ſet or ſown with acorns (not leſs than fifteen acres) agreeable to the above conditions; a ſilver medal.

3. For the third (not leſs than ten acres) a ſilver medal.

4, 5, 6. The like premiums, and on the ſame conditions, will be given for ſetting or ſowing acorns between the twentieth of September 1766, and the firſt of May 1767.

Certificates to be delivered on or before the firſt Tueſday in November 1767.

CHESNUTS. 7. For ſetting or ſowing the greateſt quantity of land with Spaniſh cheſnuts (for raiſing timber) not leſs than ſix acres, before the firſt day of May 1766, and for effectually fencing and preſerving the ſame; a gold medal.

8. For the ſecond greateſt quantity (not leſs than four acres) a ſilver medal.

9. For the third greateſt quantity (not leſs than two acres) a ſilver medal.

Certificates of having ſet or ſown, agreeable to the above conditions (and that there are five hundred Spaniſh cheſnut plants at leaſt on each acre) muſt be delivered to the Society on or before the firſt Tueſday in November 1766.

10, 11, 12. The like premiums, and on the ſame conditions, will be given for ſetting or ſowing Spaniſh cheſnuts before the firſt of May 1767.

Certificates of ſetting or ſowing, agreeable to the above conditions (and that there are five hundred Spaniſh cheſnut plants at leaſt on each acre) muſt be delivered to the Society on or before the firſt Tueſday in November 1767.

ELM. 13. For properly planting the greateſt number of the ſmall-leaved Engliſh elm, for raiſing timber (commonly uſed for keels of ſhips and water-works) not leſs than one thouſand, before the firſt day of May 1766, and for effectually fencing and preſerving the ſame; a gold medal.

14. For the ſecond greateſt number, in like manner, a ſilver medal.

15. For the third, a ſilver medal.

Certfiicates

Certificates of having planted, agreeable to the above-mentioned articles, muſt be delivered to the Society on or before the firſt Tueſday in November 1766.

16, 17, 18. The like premiums, and on the ſame conditions, will be given for properly planting the ſmall-leaved Engliſh elm, betwixt the twenty-fourth of June 1766, and the twenty-fourth of June 1767.

Certificates to be delivered on or before the firſt Tueſday in November 1767.

FIR. 19. For planting out in the year 1766, at proper diſtances, the greateſt number of that pine, commonly called the Scotch fir, (being the tree which produces the beſt red or yellow deal) not leſs than twenty thouſand; to be two years old at leaſt when planted out; and for effectually fencing and preſerving the ſame; a gold medal.

20. For the ſecond greateſt number, not leſs than ten thouſand, in like manner, a ſilver medal.

21. For the third greateſt number, not leſs than ten thouſand, a ſilver medal.

Certificates of ſuch planting muſt be delivered on or before the laſt Tueſday in January 1767. To be ſpecified in the certificates at what diſtances they have planted them.

N. B. Not leſs than one acre to be planted in any one incloſure, and they muſt be planted not nearer to each other than four feet.

22, 23, 24. For planting out from the twenty-fourth of June 1767, to the twenty-fourth of June 1768, at the diſtance of four feet apart, the greateſt number of that pine, commonly called the Scotch fir, (being the tree which produces the beſt red or yellow deal) not leſs than twenty thouſand; to be two years old at leaſt when planted out; and for effectually fencing and preſerving the ſame; a gold medal.

For the ſecond greateſt number, not leſs than ten thouſand, in like manner, a ſilver medal.

For the third greateſt number, not leſs than ten thouſand, a ſilver medal.

Certificates of planting, according to the above conditions, the ſtate of the plants at Michaelmas preceding the date of the certificates, to be delivered on or before the laſt Tueſday in December 1768.

N. B. Not leſs than one acre to be planted in any one incloſure.

WEYMOUTH PINE. 25. For planting out in the year 1766, at proper diſtances, the greateſt number of white pine, commonly called Lord Weymouth's Pine, or the New-England Pine, (being the propereſt ſort for maſts) not leſs than two thouſand, to be four years old at leaſt when planted out, and for effectually fencing and preſerving the ſame; a gold medal.

26. For the ſecond greateſt number, a ſilver medal.

27. For the third greateſt number, a ſilver medal.

Certificates of ſuch planting muſt be delivered on or before the laſt Tueſday in January 1767.

28, 29, 30, 31, 32, 33. The like premiums will be given for planting out Lord Weymouth's Pine as above, in the year 1767. Certificates thereof muſt be delivered on or before the laſt Tueſday in January 1768.

LUCERNE. 34. For ſowing or planting with lucerne, the greateſt number of acres (ten at leaſt) upon ground well cultivated, and for keeping the ſame free from weeds for three years; and giving an account of the culture, ſoil, annual produce, and its effects on cattle fed with it; twenty pounds.

35. For the next greateſt number, fifteen pounds.

36. For the next, ten pounds.

The certificates to be produced on or before the ſecond Wedneſday in December 1767.

37, 38, 39. For ſowing or planting with lucerne the greateſt number of acres (ten at leaſt) upon ground well cultivated, and for keeping the ſame free from weeds; and giving an account of the culture, ſoil, annual produce, and its effects on cattle fed with it; twenty pounds.

For the next geateſt number (eight acres at leaſt) fifteen pounds.

For

For the next (ſix acres at leaſt) ten pounds.

The certificates to be produced on or before the ſecond Wedneſday in December 1768.

CARROTS. 40. For ſowing the greateſt number of acres (not leſs than ten) with carrots, for the feeding of cattle only; giving an account of the ſoil, culture, time of taking up, produce, and their effects on cattle fed with them; twenty pounds.

41. For the next greateſt number, (not leſs than eight) fifteen pounds.

42. For the next, (not leſs than ſix) ten pounds.

The certificates to be produced on or before the firſt Tueſday in November 1766.

PARSNIPS. 43. For ſowing the greateſt quantity of land, (not leſs than ten acres) with parſnips, for the feeding of cattle only; giving an account of the ſoil, culture, produce, and their effects on cattle fed with them; twenty pounds.

44. For the next greateſt quantity of land, (not leſs than eight acres) fifteen pounds.

45. For the third greateſt quantity of land, (not leſs than ſix acres) ten pounds.

The certificates to be produced on or before the firſt Tueſday in November 1766.

46. For ſowing in the year 1767, the greateſt quantity of land, (not leſs than ten acres) with parſnips, for the feeding of cattle only; giving an account of the ſoil, culture, produce, and their effects on cattle fed with them; twenty pounds.

47. For the next greateſt quantity of land, (not leſs than ſix acres) ten pounds.

The certificates to be produced on or before the firſt Tueſday in November 1768.

N. B. The accounts of the ſoil, culture, &c. to be at the diſpoſal of the Society.

PARSLEY. 48. For ſowing the greateſt quantity of land, (not leſs than four acres) with parſley, for the feeding of ſheep only; giving an account of the ſoil, culture, produce, and its effects on the ſheep fed with it; twenty pounds.

49. For

49. For the next greateſt quantity of land, (not leſs than three acres) fifteen pounds.

50. For the third ditto, (not leſs than two acres) ten pounds.

The certificates to be produced on or before the laſt Wedneſday in February 1767.

51. For ſowing in the year 1767, the greateſt quantity of land, (not leſs than ten acres) with parſley, for the feeding of cattle only; giving an account of the ſoil, culture, produce, and its effects on cattle fed with it; twenty pounds.

52. For the next greateſt quantity of land, (not leſs than ſix acres) ten pounds.

The certificates to be produced on or before the firſt Tueſday in November 1768.

N. B. The accounts of the ſoil, culture, *&c.* to be at the diſpoſal of the Society.

BURNET. 53. For ſowing or planting with burnet the greateſt number of acres, (not leſs than ten) upon ground well cultivated, and for keeping the ſame free from weeds for two years; and giving an account of the culture, ſoil, annual produce, and its effects on cattle fed with it; twenty pounds.

54. For the next greateſt number of acres, (not leſs than eight) fifteen pounds.

55. For the next greateſt number of acres, (not leſs than ſix) ten pounds.

The certificates to be produced on or before the firſt Tueſday in December 1768.

N. B. All perſons intending to cultivate burnet, may be ſupplied with the ſeed, and receive inſtructions * for the culture of it, from Mr. Rocque, of Walham-Green, near Fulham.

* Several accounts of the culture and uſes of burnet, may be found in various parts of our collection: but the moſt ſatisfactory and late communication is Mr. Baldwin's letter on this ſubject to the Society for promoting arts, inſerted in No. 31. Vol. VI. page 259.

56. In

56. In order to promote the trials of burnet in every way, the following premiums will be given for ſowing or planting with burnet, keeping the ſame clear from weeds for two years, the greateſt quantity of land, of the leaſt * reputed value; ſuch quantity being not leſs than ten acres; giving an account of the culture, nature of the ſoil, rent of the land, annual produce, and effects of the burnet in feeding cattle; twenty pounds.

57. For the next greateſt number of acres, (not leſs than eight) fifteen pounds.

58. For the next greateſt number of acres, (not leſs than ſix) ten pounds.

The certificates to be produced on or before the firſt Tueſday in December 1769.

GRASS SEEDS GATHERED BY HAND.

59. For the greateſt quantities reſpectively of each of the following kinds of graſs ſeeds, *viz.*

Meadow Feſcue,
Meadow Foxtail,
Yellow Oat,
Common Poa,
Annual Poa,
Vernal,
Fine Bent,
Sheeps Feſcue,
Creſted Dog's-tail,

gathered clean from the fields by hand, when ripe, in the year 1766, or produced, and clean ſaved from ſuch ſeeds gathered in the year 1765, as ſhall be ſeparately ſown in

* It appears, that burnet will yield a greater crop, on dry ſhaley land, than any other herb hitherto cultivated in the view of a graſs. Its great utility ſeems to depend in a principal degree on this quality. The Society, having procured ſufficient trials of it, in a general way, have, therefore, judiciouſly made this attempt to aſcertain, what the degree of advantage may be, that will ariſe from the cultivating it on the cheapeſt and worſt kind of land. A perſuit, which ſeems pregnant with very great benefit to the public, in the preſent circumſtances, as to the price of butchers meat, and proviſions in general. O. E.

drills, and kept clean from all mixtures of other graſſes and weeds; ten pounds.

Certificates of ſuch ſeparate ſowing in drills and weeding, together with certificates under the hands of the miniſter and churchwardens, or of two or more of the principal inhabitants of the pariſh, aſcertaining the quantities gathered; together with a ſmall ſample of each kind of ſeed, certified as above to have been taken indifferently and unpicked out of the groſs quantity gathered, with a few plants of each kind of graſs having the ſeed upon them as it grew; to be produced to the Society on or before the firſt of December 1766.

60. For the ſecond greateſt quantity, five pounds.

Specimens of the graſſes * in ſeed are to be ſeen at the Society's room in the Strand; and drawings of them in Mr. Stillingfleet's Miſcellaneous Tracts, and in Mr. Mill's third Volume of Huſbandry.

61. For the greateſt quantity of land, (not leſs than one acre) which ſhall be ſown with any one of the above-mentioned ſorts of graſs-ſeeds unmixed, in the year 1767, the Society will give a premium of twenty pounds for each quantity of land ſo ſown, the ſowing to be in drills for the convenience of keeping the graſs from weeds.

Certificates ſigned as above, aſcertaining the quantity of the land ſown, the quality of the ſoil, that the ſeed was ſown in drills, and clean hoed and weeded; to be produced to the Society on or before the firſt of December 1767.

N. B. The Society will be ready to purchaſe ſuch clean ſeeds of the above graſſes as ſhall be brought to them between the firſt day of Auguſt and the firſt day of December, in the year 1767, at prices to be aſcertained in their publications for that year, and will diſtribute the ſame *gratis*, among ſuch members of the Society as ſhall give

* Deſcriptions and accounts of theſe graſſes, will be found in No. 35. Vol. V. page 173, of this work: and prints of them are given in No. 73. Vol. IV. page 318. E. O.

in their names to the ſecretary between the firſt day of January and the firſt day of March, in the year 1768.

CULTIVATING OF WHEAT, &c. 62. It not being yet aſcertained by ſufficient trials, whether ſowing in broad-caſt * or in drills, horſe-hoeing the intervals, be the moſt proper method of cultivating wheat, the Society will give to the perſon who ſhall produce the moſt accurate account of experiments, with the ſucceſs in each method, and a deſcription of the ſoil in which each experiment has been made; a gold medal.

63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74. The like premium will be given for the like account of experiments on each of the following articles, reſpectively, *viz.* Rye, Oats, Barley †, Lucerne, Saintfoin, Carrots, Parſnips, Parſley, Turneps, Beans, Peas, and Tares or Vetches.

The candidates muſt deliver in their accounts on or before the firſt Tueſday in December 1767.

N. B. The Society expects that the places ſhall be ſpecified where ſuch experiments were made; and that the experiment in the broad-caſt, and in the horſe-hoeing method, be in the ſame kind of ſoil, and as contiguous as may be.

The premiums for the above-mentioned articles, are extended to Scotland and Ireland, and alſo to the Britiſh colonies on the continent of North America.

MADDER. 75. The Society do hereby certify, that they will give the ſum of five pounds for every acre of land planted with madder, as far as one hundred acres, in England or

* An account of the comparative advantages of the drill and broad-caſt methods of cultivating, given by Mr. Wynne Baker to the Dublin Society, is to be found in page 280 of this Volume. Another very diſtinct account of the reſult of experiments on the ſame ſubject is inſerted above, page 319, of this number. E.

† Accounts of the drill-culture of barley and lucern, may be ſeen in Mr. Baker's report, Vol. V. No. 52. page 257, of our *Muſeum*. The account of the drill and broad-caſt method of cultivating lucerne, for which the laſt year's premium was given by the London Society, is inſerted in *Muſeum* for laſt March, No. 25. page 170. E. O.

Wales; but in caſe there ſhould be claimants for more than one hundred acres, then the ſum of five hundred pounds to be divided among the claimants, in proportion for every acre of each reſpective claimant. It is required that the plants be of the growth of England or Wales, and that no leſs than twenty thouſand plants be ſet on every acre. The time appointed for the planting of the ſets, is to be from the 31ſt of March 1765, to the 31ſt of March 1766. Proper certificates of all theſe conditions are to be ſent to, and received by the ſecretary of the Society, on or before the firſt Tueſday in November 1766 incluſive; after which day no certificates or claimants will be allowed of.

N. B. Receipts of the purchaſe of the plants, if not of their own growth, as well as the above-mentioned certificates, are to be produced.

76. The Society do hereby certify, that they will give the ſum of five pounds for every acre of land planted with madder, as far as one hundred acres, in England or Wales; but in caſe there ſhould be claimants for more than one hundred acres, then the ſum of five hundred pounds to be divided amongſt the claimants, in proportion for every acre of each reſpective claimant, not leſs than twenty thouſand plants to be ſet in every acre. The time appointed for the planting of the ſets is to be from the 31ſt of March 1766, to the 30th day of April 1767. Proper certificates of thoſe conditions are to be ſent to, and received by the ſecretary of the Society, on or before the firſt Tueſday in November 1767.

77. To the perſon who ſhall raiſe the greateſt quantity of madder upon an acre, the quantity to be determined by the weight of the roots when taken up and cleaned; the candidates to give a particular account of their manner of culture; twenty pounds.

The certificates of the weight of the roots, when cleaned, to be ſent in on or before the firſt Wedneſday in November 1768.

WILD MADDER. 78. To the perſon who ſhall plant and cultivate the greateſt number of plants (not leſs than five hundred) of the wild ever-green madder *, of which a great quantity grows in Devonſhire; twenty pounds.

Certificates of the number of the plants, with twenty of the plants, to be ſent to the Society on or before the ſecond Wedneſday in Novemher 1766.

PRESERVING THE LIVES OF BEES. Whereas the uſual method of ſaving the honey from ſtocks or hives, is by deſtroying the bees; and whereas it is found by experience, that the honey and wax may be obtained, and the bees preſerved at the ſame time; by which much larger quantities of both wax and honey are collected:

79. The Society will give a ſum not exceeding two hundred pounds, for collecting wax, and preſerving the lives of the bees, in the following proportion: To every perſon who ſhall collect from ſtocks of bees, his own property, within the year 1767, ten pounds of clean merchantable wax, without deſtroying the bees, leaving a ſufficient quantity of honey for their winter ſuſtenance; five pounds.

But in caſe there ſhall be above forty claimants, then the ſum of two hundred pounds ſhall be diſtributed among the candidates, in proportion to the number of claimants.

Certificates of the quantity of wax and of the bees in each ſtock being alive on the firſt of February 1768, to be delivered on or before the firſt of March following.

N. B. A compleat apparatus for the purpoſes abovementioned, may be ſeen at the Society's Office in the Strand.

MACHINE FOR DRAINING LANDS. 80. For a plough or machine, of the ſimpleſt conſtruction, which ſhall, with the leaſt force, cut a new drain one foot in depth perpendicular, one foot eight inches

* The accounts of the experiments and obſervations, made by Mr. Dambourney on the *wild madder*, which induced the Society to offer this premium, may be found in *the Eſſays on Agriculture and Arts*, Art. V. page 29. E. O.

wide

wide at the top, and ten inches at bottom; both ſides of the drain equally ſloping, and the earth to be equally thrown out on both ſides; fifty guineas.

Certificates of the machine having performed the work agreeable to the terms of the advertiſement, muſt be delivered in, together with a model, on or before the firſt Wedneſday in December 1766.

MACHINE FOR SLICING TURNEPS. 81. For the beſt cheap * machine for ſlicing turneps, in order to feed cattle, that will diſpatch large quantities with more eaſe and expedition than by any method now practiſed; twenty pounds. To be produced to the Society on or before the firſt Tueſday in November 1766.

TURNEP-CABBAGE. 82. For raiſing and duly cultivating the † turnep-cabbage, for the feeding cattle and ſheep, on the greateſt number of acres, (not leſs than three) and giving an account of the ſoil, culture, time of taking up, produce, and the effects on cattle and ſheep fed with them; twenty pounds.

83. For the next greateſt number of acres, (not leſs than two) fifteen pounds.

The certificates, agreeable to the above conditions, to be produced on or before the third Saturday in March 1767.

84, 85. The ſame premiums are continued for the year 1767; and the certificates are to be produced on or before the firſt Wedneſday in November 1768.

BOORCOLE. 86. For ſowing, in the ſpring of the year 1767, and duly cultivating boorcole ‡, for the feeding of cat-

* Obſervations on the utility of this machine, and the reaſons for inſtituting the premium, may be found in Vol. V. No. 78. page 387. and in the notes on Mechanicus's letter, page 115, of the February number. E. O.

† An account of the culture, uſe, and advantages of the turnep cabbage, may be found in Mr. Wynne Baker's report, No. 52. Vol. V. page 257; and in Agricola's letter on that ſubject, Vol. VI. No. 7. page 46, of the January *Muſeum*. E. O.

‡ An account of the culture and uſes of boorcole, in feeding cattle, &c. may be ſeen in Mr. Wynne Baker's report, inſerted Vol. V. No. 52. page 257, of our work. E. O.

tle and ſheep, on the greateſt number of acres (not leſs than three) and giving an account of the ſoil, culture, produce, and effects on cattle and ſheep fed with it; twenty pounds.

87. For the next greateſt number of acres, (not leſs than two) fifteen pounds.

The certificates to be produced on or before the firſt Tueſday in May 1768.

Premiums for Diſcoveries and Improvements in Chemiſtry, Dying and Mineralogy.

SAL AMMONIAC. 88. For making the greateſt quantity of ſal Ammoniac, equal in goodneſs to the beſt imported, (not leſs than two tons) prepared at one manufactory in England or Wales, fifty pounds weight of which to be produced as a ſample, on or before the third Tueſday in March 1767; one hundred pounds.

SUBSTITUTE FOR BORAX. 89. For five pounds weight of any ſubſtance made of Britiſh materials, that will anſwer the uſes of borax in ſoldering, and is cheaper than borax, to be produced on or before the firſt Tueſday in January 1767; fifty pounds.

DYING SILK IN GRAIN. 90. For the moſt beautiful and durable ſcarlet dyed in ſilk with cochineal, not leſs than one pound to be produced as a ſpecimen, on or before the ſecond Tueſday in December 1766; forty pounds.

DYING YARN YELLOW. 91. For the greateſt improvement in dying cotton or linen yarn yellow, a ſpecimen, not leſs than one pound, muſt be produced on or before the firſt Tueſday in December 1766; forty pounds.

DYING YARN GREEN. 92. For the greateſt improvement in dying cotton or linen yarn green, not leſs than one pound, to be produced on or before the firſt Tueſday in December 1766; twenty pounds.

Premiums for promoting Polite Arts.

DRAWING AT THE ACADEMY IN ST. MARTIN's LANE. 93. For the beſt drawings of a human figure after

after the life, done at the Academy in St. Martin's-Lane, by youths under the age of twenty-four, to be produced on or before the firſt Tueſday in February 1767, and determined in proportion to their merits; twenty guineas.

Theſe drawings are to be made during the meetings of the academy next winter, according to the rules laid down by the Society, which will be hung up at the academy.

To be made with chalks only.

DRAWINGS FROM THE DUKE OF RICHMOND's GALLERY. 94. For the beſt drawings of any ſtatue, at the candidate's option, in the Duke of Richmond's gallery, by youths under the age of twenty-one, to be produced on or before the firſt Tueſday in December 1766; an honorary pallet of ſilver gilt.

95. For the next in merit, an honorary pallet of ſilver.

Theſe drawings muſt be left with the perſon who takes care of the ſtatues, until they are delivered to the Society, and muſt be made with chalks only.

DRAWINGS OF A HUMAN FIGURE. 96. For the beſt drawing of a naked human figure, not leſs than ſixteen inches high, after a picture, print, or drawing, by youths under the age of ſixteen, to be produced on or before the laſt Tueſday in November 1766; an honorary pallet of ſilver gilt.

97. For the next in merit, an honorary pallet of ſilver.

The drawing to be made with chalk, or black lead; and of a different ſize from the original, which muſt be produced at the ſame time.

DRAWINGS OF BEASTS, BIRDS, &c. 98. For the beſt drawings or compoſitions of beaſts, birds, dead game or ſtill-life, after nature, by perſons of either ſex, under the age of twenty-one, to be produced on or before the ſecond Tueſday in January 1767; an honorary pallet of ſilver gilt.

99. For the next in merit, an honorary pallet of ſilver.

DRAWINGS OF FRUIT, FLOWERS, &c. 100. For the beſt drawings or compoſitions of fruit, flowers, or plants, with or without reptiles or inſects, after nature, by perſons of either ſex under the age of twenty-one; to be produced on or before the ſecond Tueſday

Tueſday in January 1767; an honorary pallet of ſilver gilt.

101. For the next in merit, an honorary pallet of ſilver.

To be made with crayons, water colours, red or black pencils.

PATTERNS FOR WEAVERS. 102. For the beſt original pattern for weavers, by perſons of either ſex, of any age under thirty; to be produced on or before the ſecond Tueſday in January 1767; fifty guineas.

DRAWINGS OF LANDSCAPES. 103. For the beſt drawings of landſcapes after nature, begun and finiſhed on the ſpot, by perſons under the age of twenty-five; to be produced on or before the ſecond Tueſday in November 1766, and determined in proportion to their merits; twenty guineas.

Each candidate muſt mention, on the front of his drawing, from whence he took his view; and the drawings muſt be made with chalk, pen, Indian ink, or biſter.

HONORARY PREMIUMS FOR DRAWINGS. 104, 105, 106. In order to promote a love of the polite arts, and excite emulation among the nobility, a gold medal will be given for the beſt original deſign of any kind, made with chalks, black lead, pen, Indian ink, or biſter; a ſilver medal for the ſecond in merit; and a ſilver medal for the third in merit; by young gentlemen under the age of twenty, ſons of peers, or peereſſes in their own right, of Great Britain or Ireland; to be produced on or before the firſt Tueſday in March 1767.

107, 108, 109. The ſame premiums will be given on the like conditions to young ladies, daughters of peers, or peereſſes in their own right, of Great Britain or Ireland.

110, 111, 112. A gold medal will be given for the beſt original deſign of any kind, made with chalks, black lead, pen, Indian ink, or biſter; a ſilver medal for the ſecond in merit; and a ſilver medal for the third in merit; by young gentlemen under the age of ſixteen, ſons of peers,

or peereſſes in their own right, of Great Britain or Ireland; to be produced on or before the firſt Tueſday in March 1767.

113, 114, 115. The ſame premiums will be given on the like conditions to young ladies, daughters of peers, or peereſſes in their own right, of Great Britain or Ireland.

BASSO RELIEVO IN CLAY. 116. For the beſt baſſo relievo in clay; the ſubject to be the death of Lucretia; by youths under the age of twenty-five, being their own compoſition; the height of the principal figure not leſs than fifteen inches; to be produced on or before the firſt Tueſday in February 1767; twenty guineas.

MODELS IN CLAY. 117. For the beſt models in clay, of an intire figure or figures, or baſſo relievo's, by youths under the age of twenty, being their own compoſition; to be produced as above; an honorary pallet of ſilver gilt.

118. For the next in merit, an honorary pallet of ſilver.

The models and baſſo relievos to remain two months with the Society after the determination.

MODELS OF ORNAMENTS IN WAX. 119. For the beſt models in wax of figures of beaſts or birds, fruit, flowers, or foliage, by perſons of either ſex under the age of twenty-one, taken from nature, and not from prints, drawings, models, or any fine works; to be produced as above; an honorary pallet of ſilver gilt.

120. For the next in merit, an honorary pallet of ſilver.

ETCHINGS BY YOUTHS. 121. For the beſt etchings copied from any prints, not leſs than nine inches by ſix, each compoſition to be larger than the original, repreſenting landſcapes with figures, by young men under the age of twenty-five.

To be produced with the plates on or before the ſecond Tueſday in November 1766, and determined in proportion to their merits; twenty guineas; and three impreſſions to be taken from each of them for the uſe of the Society.

DITTO

DITTO BY YOUNG WOMEN. 122. For the beſt etchings copied from any prints, not leſs than nine inches by ſix, each compoſition to be larger than the original, repreſenting landſcapes with figures, by young women under the age of twenty-five.

To be produced with the plates on or before the ſecond Tueſday in November 1766, and determined in proportion to their merits; twenty guineas; and three impreſſions to be taken from each of them for the uſe of the Society.

METZOTINTOS BY YOUNG MEN. 123. For the beſt ſcraping in metzotinto of a portrait from any picture of which there is no print, by perſons under the age of twenty-five; twenty-five guineas.

The pictures to be produced with the plates on or before the ſecond Tueſday in November 1766, and determined in proportion to their merits; and three impreſſions to be taken from each of them for the uſe of the Society.

DITTO BY YOUNG WOMEN. 124. For the beſt ſcraping in metzotinto of a portrait from any picture of which there is no print, by young women under the age of twenty-five; twenty-five guineas.

The pictures to be produced with the plates on or before the ſecond Tueſday in November 1766, and determined in proportion to their merits; and three impreſſions to be taken from each of them for the uſe of the Society.

ENGRAVING LANDSCAPES. 125. For the beſt engraving of a landſcape with figures, after a picture or drawing made by the candidate, from a picture of which there is no print, not leſs than ſixteen inches by twelve, by perſons under the age of twenty-four; twenty guineas.

To be produced with the plates on or before the ſecond Tueſday in November 1766, and of a different ſize from the original; and three impreſſions to be taken from each of them for the uſe of the Society.

INTAGLIOS. 126. For the beſt intaglio engraved on an oval red cornelian, repreſenting the Bacchus of

Michael Angelo in the Duke of Richmond's gallery, by perſons under the age of twenty-eight; to be delivered, ſealed up, on or before the ſecond Tueſday in November 1766; twenty guineas.

The intaglios to be left with the Society one month, and three impreſſions in ſulphur to be taken from them for the uſe of the Society.

BRONZES. 127. For the beſt figure in bronze caſt and repaired, not leſs than eight inches high; to be brought in repaired on or before the firſt Tueſday in February 1767; twenty guineas.

It is not expected that the caſting and repairing be the work of a ſingle perſon.

The caſts to be ſhewn to the Society before they are begun to be repaired.

The bronze, which gains the premium, to be left with the Society one month.

LANDSCAPE PAINTINGS. 128. For the beſt original landſcape, on a canvas ſix feet four inches long, and four feet ſix inches high; fifty guineas.

For the next in merit, twenty-five guineas.

Proof muſt be made to the ſatisfaction of the Society, that the whole of each picture was painted in England, and ſince the firſt of January 1766.

The pictures to be delivered, without frames, to the regiſter of the Society, on or before the ſecond Tueſday in March 1767; and thoſe which gain premiums, muſt remain with the Society two months after the deciſion.

STATUES IN MARBLE. 129. For the beſt original ſtatue of a naked figure, as large as the life, wrought in white marble; to be produced on or before the laſt Tueſday in March 1767; one hundred and forty guineas.

130. For the next in merit, eighty guineas.

BASSO RELIEVO's IN MARBLE. 131. For the beſt baſſo relievo, wrought in white marble, being an original compoſition of five or more human figures; the height of the principal figure not leſs than twelve inches; to be produced on or before the laſt Tueſday in March 1767; fifty guineas.

132. For

132. For the next in merit, twenty-five guineas.

Proof muſt be made to the ſatisfaction of the Society, that the whole of each ſtatue and baſſo relievo was executed in England, ſince the firſt of January 1765; and thoſe ſtatues and baſſo relievos which gain the premiums ſhall remain with the Society two months after the deciſion.

No perſon who has gained the firſt premium in any claſs will be admitted a candidate in a claſs of an inferior age; and no candidate ſhall receive more than one premium in one year; nor will they who for two ſucceſſive years ſhall gain the firſt premium in any one claſs, be ever again admitted as candidates in that claſs.

Perſons to whom premiums ſhall be adjudged, will be expected to give ſatisfactory proofs, that the performances by them produced are intirely their own without aſſiſtance.

No candidate ſhall ſend in more than one performance in any one claſs.

Premiums for encouraging and improving Manufactures.

FINE LINEN YARN. For fine linen yarn fit for lace or number thread.

133. To any woman or girl who ſhall produce to the Society the beſt fine linen yarn, not leſs than three pounds weight, fit for lace or number thread, and ſpun by themſelves; twelve guineas.

134. For the next in merit, ſix guineas.

The thread to be ſpun after the firſt of April 1766, and produced to the Society on or before the firſt Tueſday in January 1767.

An ounce of each of the parcels which gain premiums to remain the property of the Society.

FINE BROAD CLOTH FIT FOR THE SOUTHERN MARKETS. Whereas notwithſtanding the manifeſt ſuperiority of the beſt Engliſh broad cloths, there is a kind of fine cloths in much demand at ſeveral foreign markets, and particularly thoſe of the ſouthern countries of Europe, eſpecially of the following colours, *viz.* ſcarlet, black, blue, green, and white; the chief recommendatory

datory qualities of which cloths are fineneſs, lightneſs, a ſpungineſs of texture that ſerves effectually to imbibe the dyes; ſo ſmall a degree of preſſure as will not injure the colours, or occaſion ſpots from rain; the Society, from a deſire of contributing all means in their power for extending our moſt valuable commerce in exported manufactures, do offer the following premiums, on the conditions annexed.

135. To the perſon or perſons, who ſhall, on or before the firſt day of December 1766, have made and ſold the greateſt number of pieces, not leſs than ten, of ſuch cloths as are above deſcribed, each piece to be full ſeven quarters wide, and of the uſual length of broad cloth; forty pounds.

136. To the perſon or perſons, who ſhall have made and ſold the next greateſt number of ſuch pieces, not leſs than ſix in like manner; twenty pounds.

Satisfactory certificates of the making and ſelling of the ſaid cloths, with the names of the purchaſers, the dates of ſales, and the prizes ſold at; alſo, a piece of cloth (for the Society's inſpection only) from each candidate, dyed either ſcarlet or black, and properly preſſed, muſt be ſent in on or before the ſecond Tueſday in December 1766.

KNITTING MITTS. 137. For the greateſt quantity of mitts made of thread, in imitation of lace, and made with knitting needles, fit for womens wear; not leſs than one dozen pair; each pair to be not leſs than fourteen inches in length, made by one perſon; the goodneſs, clearneſs, and fineneſs of the work, and beauty of the pattern, to determine the preference; twenty guineas.

The whole ſum to be divided in proportion to the merit; to be produced on or before the firſt Tueſday in January 1767.

N. B. The perſons who gain any of the above premiums to leave one yard of the lace, and one pair of mitts, as the property of the Society.

WATCH FUSEE CHAINS. 138. To the perſon who ſhall, before the laſt Tueſday in December 1766, have inſtructed in the beſt manner in any one manufac-

tory the greateſt number of women and girls, not leſs than ſix, in making watch fuſee chains; thirty pounds.

N. B. Certificates are to be produced, that the ſeveral perſons ſo taught do actually gain their livelihood by making ſuch fuſee chains at the time of the claim.

139. To the perſon who ſhall, before the laſt Tueſday in December 1767, have inſtructed in the beſt manner in any one manufactory the greateſt number of women and girls, not leſs than four, in making watch fuſee chains; forty pounds.

N. B. Certificates are to be produced, that the ſeveral perſons ſo taught do actually gain their livelihood by making ſuch fuſee chains at the time of the claim.

And ſamples of each of their performances are at the ſame time to be exhibited for the approbation of the Society.

Premiums for Invention and Improvement in Mechanics.

MACHINE FOR EXTRACTING WATER OUT OF SHIPS. 140. To the perſon who ſhall make, and prove by actual experiment on board of ſome ſhip in the river Thames, to the ſatisfaction of the Society, on or before the firſt Tueſday in May 1767, the beſt pump, engine, or other machine for extracting water out of ſhips, to be eſſentially ſuperior to the chain pump, or any other engine now known or in uſe, as well for the expedition of work as for the ſaving of the labour of men; and in which ſimplicity and eaſineſs of repair will be conſidered as a material part of its merit; one hundred pounds.

IMPROVEMENT IN WHEEL CARRIAGES. 141. To the perſon who ſhall make the greateſt improvement in wheel carriages, with reſpect to the eaſineſs of the draught, the facility of turning, and preſervation of the roads; one hundred pounds; or a leſs ſum in proportion to the merit of ſuch improvement.

N. B. It is expected that the whole machine, whether waggon, coach, *&c.* complete for uſe, be produced by each

each candidate; and that notice be ſent to the regiſter of the Society on or before the firſt Tueſday in March 1767, that the ſaid machines are in London ready for examination and trial.

Premiums offered for the Advantage of the Britiſh American *Dominions.*

IRON FROM BLACK SAND IN AMERICA.

142. To the perſon who ſhall make and import, or cauſe to be imported into the port of London, on or before the twenty-fifth of December 1766, the greateſt quantity of merchantable bar-iron, made of the black ſand found in America; (not leſs than fifty tons) one hundred pounds.

143. For the ſecond greateſt quantity, (not leſs than thirty tons) ſixty pounds.

144. For the third greateſt quantity, (not leſs than twenty tons) forty pounds.

PEARL-ASH. 145. For every ton of merchantable pearl-aſh, made in any of his majeſty's dominions in America, imported into the port of London within the year 1766; four pounds; except the ſeveral claims ſhall amount to a greater ſum than four hundred pounds, in which caſe the ſaid four hundred pounds ſhall be divided amongſt the claimants, in proportion to the reſpective quantities imported by each.

COCHINEAL. 146. For the greateſt quantity of merchantable cochineal, (not leſs than fifteen pounds weight) that ſhall be produced in, and imported from his majeſty's dominions in North America, the Weſt-India iſlands, and the Bahama iſlands, into the port of London, between the twenty-fifth of April 1766, and the twenty-fifth of April 1767; forty pounds.

147. For the ſecond greateſt quantity, (not leſs than ten pounds) twenty pounds.

148. For the third greateſt quantity, (not leſs than five pounds) ten pounds.

SCAMMONY. 149. For the greateſt quantity of good merchantable ſcammony, (not leſs than ten pounds weight)

weight) that ſhall be produced in, and imported from any of the Britiſh colonies in America into the port of London, between the firſt of January 1766, and the firſt of January 1767; fifty pounds.

150. For the next greateſt quantity, (not leſs than five pounds weight) twenty-five pounds.

The ſeveral requiſites contained in the foregoing articles, are to be aſcertained by the following proofs, and in the following manner, *viz.*

Firſt, by a certificate under the hand and ſeal of any known magiſtrate, or other public officer of the county, pariſh, precinct, townſhip, or other diviſion of the iſland or colony, within which pariſh, county, or other diviſion, the article for which this premium is claimed has been produced, that the ſaid article, expreſſing the quantity and the plantation whereon produced, is, of his own knowledge, or has been proved before him to have been the actual produce of ſuch iſland, or colony, or county, pariſh, or other diviſion thereof, between the times ſpecified in each advertiſement.

Secondly, by a certificate under the hand and ſeal of the proper officer of the port in the plantations in which ſuch article ſhall be ſhipped for exportation, that the ſaid article, expreſſing the quantity, has been actually entered with him for exportation to Great Britain as the produce of the ſaid plantations.

Thirdly, a certificate under the hand and ſeal, of the proper officer of the port of London, that ſuch article, expreſſing the quantity, has been actually imported from the plantations, expreſſing the iſland or colony from whence imported.

N. B. The goodneſs of the article for which the premium is claimed, muſt be proved by a certificate under the hand and ſeal of ſome well known merchant or broker, dealing in the article for which the premium is claimed, or by ſuch experiment or examination as the Society ſhall judge neceſſary.

The requiſites in the premiums for iron from black ſand of America, pearl aſh and cochineal, are to be aſcertained by the following proofs, *viz.*

The firſt three articles the ſame as before; but inſtead of the *N. B.* the following article is inſerted, *viz.*

Fourthly, a certificate under the hand and ſeal of ſome well known merchant or broker, dealing in the article for which the premium is claimed, of the goodneſs of ſuch article; or proof may be made of its goodneſs by ſuch other experiment and examination as the Society ſhall judge neceſſary.

VINES FOR RAISINS. 151. A premium of three hundred pounds will be given to that perſon who ſhall, on the firſt of September 1767, have or be poſſeſſed of a vineyard or plantation in any of the colonies upon the continent of North America, Southward of the river Delawar, conſiſting of the greateſt number of vines, (not leſs than fifty) actually producing the true Malaga grape, from which the beſt raiſins are made.

152. And one hundred pounds for a like plantation or vineyard, conſiſting of not leſs than twenty-five plants, producing the ſaid grapes.

153, 154. The ſame premiums for vines for raiſins will be continued to the year 1770, with the following additional *N. B.*

N. B. It will be expected that the claimants for the above premiums ſhould, at the time of making the claim, produce a quantity (not leſs than ſix pounds) of raiſins, certified to have been actually produced from vines for which the premium is claimed.

VINES FOR WINES. 155. A premium of two hundred pounds will be given for the greateſt number (not leſs than five hundred) of the plants of the vines, which produce thoſe ſorts of wines now conſumed in Great Britain, which ſhall have been properly planted, and effectually fenced, ſecured and cultivated within any of the Britiſh colonies upon the continent of North America, to the Northward of the river Delawar, conſidered as one

diſtrict,

diſtrict, between the firſt of April 1762, and the firſt of April 1767.

156. And fifty pounds for the next greateſt quantity, not leſs than one hundred plants.

157, 158. The like premiums will be given, upon the ſame conditions, for the greateſt number of vines in like manner planted and cultivated as above, within the ſame time, in any of the Britiſh colonies on the continent of North America, to the Southward of the river Delawar, conſidered as one diſtrict.

159, 160. And the ſame premiums, for the greateſt quantity in like manner planted and cultivated within the ſame time, in the Bermuda iſlands.

161, 162. The like premiums will be given, upon the ſame conditions, for the greateſt number of vines which produce thoſe ſorts of wines now conſumed in Great Britain, which ſhall have been properly planted, and effectually fenced, ſecured and cultivated within any of the Britiſh colonies upon the continent of North America, to the Southward of the river Delawar, or in the Bermuda iſlands, each to be conſidered as one diſtrict, between the firſt of April 1767, and the firſt of April 1768.

163. A premium of two hundred pounds will be given for the greateſt number (not leſs than five hundred) of the plants of the vines actually producing the grapes that yield thoſe ſorts of wines now conſumed in Great Britain, which ſhall have been properly planted, and effectually fenced, ſecured and cultivated within any of the Britiſh colonies upon the continent of North America, to the Northward of the river Delawar, conſidered as one diſtrict, between the firſt of April 1768, and the firſt of March 1770.

164. And fifty pounds for the next greateſt quantity, not leſs than one hundred plants.

165, 166. The like premiums will be given, upon the ſame conditions, for the greateſt number of vines in like manner planted and cultivated as above, within the ſame time, in any of the Britiſh colonies on the continent of North America, to the Southward of the river Delawar, conſidered as one diſtrict.

167, 168. And the ſame premiums, for the greateſt quantity in like manner planted and cultivated, within the ſame time, in the Bermuda iſlands.

CINNAMON. 169. A premium of one hundred pounds will be given for the greateſt number (not leſs than fifty) of the plants of the true cinnamon tree which now grows in the iſland of Guadaloupe, properly raiſed or planted, and effectually fenced, ſecured and cultivated in any of the Britiſh iſlands in that part of America commonly called the Weſt Indies, between the firſt of January 1763, and the firſt of January 1767.

170. And fifty pounds for the next greateſt quantity, not leſs than twenty five-plants.

171, 172. The like premiums will be given, upon the ſame conditions, for the greateſt number of cinnamon trees, properly planted, ſecured and cultivated as above, in the Bahama iſlands, within the ſame time.

ALOES. 173. The like premium of one hundred pounds will be given, upon the ſame conditions, for the greateſt quantity (not leſs than fifty) of the aloes plants, of the ſame ſpecies as that from which the true ſocotorine aloe is produced, properly planted, and effectually fenced, ſecured and cultivated within any of the Britiſh iſlands in that part of America called the Weſt Indies, between the firſt of January 1763, and the firſt of January 1767.

174. And fifty pounds for the next greateſt quantity, not leſs than fifty plants.

175, 176. The like premiums will be given, upon the ſame conditions, for the greateſt number of aloes, properly planted, and effectually fenced, ſecured and cultivated, within the ſame time, in the Bahama and Bermuda iſlands.

N. B. The plant of the true ſocotorine aloe may be procured from moſt of the Botanic gardens about London.

BARILLA. 177. The like premium of one hundred pounds will be given, upon the ſame conditions, to any perſon who ſhall plant and properly cultivate the greateſt quantity of land (not leſs than fifty acres) with Spaniſh kali or glaſs-wort, of the ſame ſpecies as that from which

barilla

barilla is produced, within any of the Britiſh colonies upon the continent of America to the Southward of the river Delawar, between the firſt of April 1766, and the firſt of April 1767.

178. And fifty pounds for the next greateſt number of acres, not leſs than twenty-five.

The claims upon the foregoing articles of culture to be reſpectfully aſcertained by a certificate under the hand and ſeal of ſome known magiſtrate, or chief officer of the county, pariſh, diſtrict, precinct, townſhip, or other diviſion of the colony or iſland within which pariſh, county, or other diviſion of ſuch colony or iſland, the article for which the premium is claimed has been planted, that the ſaid article, expreſſing the number of plants, (or acres, as the caſe ſhall be) and the name of the planter, has, of his own knowledge, or has been proved before him to have been planted, and effectually ſecured and cultivated within the ſaid colony or iſland, between the times ſpecified in the advertiſement, and was under actual and proper culture at the time of ſigning ſuch certificate.

SILK COCOONS. 179. For every pound weight of cocoons produced in the provinces of Georgia and South Carolina in the year 1766, of a hard, weighty, and good ſubſtance, wherein one worm only has ſpun; three pence.

180. For every pound weight of cocoons produced in the ſame year, of a weaker, lighter, ſpotted or bruiſed quality, though one worm only has ſpun in them; two pence.

181. For every pound weight of cocoons produced in the ſame year, wherein two worms have ſpun; one penny.

N. B. Theſe premiums will be paid under the direction of Mr. Ottolenghé, ſuperintendant of the ſilk culture in Georgia, to every perſon who ſhall bring his or her balls or cocoons to the public filature at Savannah; upon proof being made to the ſaid Mr. Ottolenghé's ſatisfaction, by every perſon claiming ſuch premium, that the cocoons for which the premium is claimed are of ſuch claimant's own raiſing and produce; and the ſum which ſhall be ſo paid

by

by the Society's correſpondent as aforeſaid, ſhall be reimburſed and repaid to him or his order by the Society, upon receiving his account of the ſame properly atteſted.

SILK, RAW. 182. For every pound weight of merchantable raw ſilk raiſed and produced in the colonies of Connecticut, Pennſylvania, and North Carolina, in the year 1766, two ſhillings and ſix-pence; the ſaid premiums to be paid by the Society's correſpondents in the reſpective colonies, *viz.*

Connecticut, by { Col. Phineas Lyman, The Rev. Mr. Thomas Clap, and Jared Ingerſall, Eſq.

Pennſylvania, { Benj. Franklin, LL. D. and John Hughes, Eſq.

North Carolina, { George Pollock, Cullen Pollock, and John Rutherford, } Eſqrs.

Upon proof being made, to their ſatisfaction, by every perſon claiming ſuch premium, that the ſilk for which it is claimed has been actually and *bona fide* reeled from cocoons of ſuch claimant's own raiſing and produce; and the ſums which ſhall be ſo paid by the Society's correſpondents as aforeſaid, ſhall be reimburſed and paid to them reſpectively, or their order, by the Society, upon receiving their accounts properly atteſted.

NITRE IN AMERICA. 183. For every thouſand pound weight of merchantable ſalt-petre, equal in goodneſs to the beſt imported from the Eaſt Indies, made in any of his majeſty's dominions in America, and imported into the port of London in the year 1766, five pounds; except the ſeveral claims ſhall amount to a greater ſum than three hundred pounds; in which caſe the ſaid ſum of three hundred pounds ſhall be divided among the claimants, in proportion to the reſpective quantities imported by each.

COBALT IN AMERICA. 184. To the perſon who ſhall diſcover cobalt in his majeſty's dominions in America, and

and ſhall produce one hundred weight of the ſame to this Society, on or before the firſt of January 1767; fifty pounds.

N. B. Satisfactory certificates of the place where it was diſcovered, and of the probability that a quantity may be had ſufficient for a manufactory of zaffre and ſmalt, will be expected by the Society.

N. B. The claims ariſing from all the foregoing articles relative to the colonies muſt be made, and the certificates brought into the Society within four months after the dates mentioned in the reſpective advertiſements.

PROVINCIAL GARDENS. 185. As the ſetting apart proper ſpots of land in our colonies in North America, as gardens or nurſeries for the making experiments in raiſing ſuch rare and uſeful plants as are not the ſpontaneous growth of this kingdom or of the ſaid colonies, as well as for receiving ſuch as are the produce of America, but at preſent not commonly known; and the appointing proper perſons to ſuperintend ſuch gardens or nurſeries, may be of great public utility in introducing a variety of articles of commerce, neceſſary for manufactures, medicine, or otherways, (which we are now obliged to take from foreign nations) thereby laying a foundation for a more extenſive culture of them: the Society, deſirous of promoting this object as far as lies within their province, and the nature of their deſign, do hereby declare, that in caſe the legiſlatures of any of the ſaid colonies, or any other incorporate bodies, ſhall think fit to encourage ſuch undertakings by public grant, or private contributions, the Society will, from time to time, as experiments made in ſuch gardens ſhall ſucceed in the production of any article of public uſe, give proper premiums for the more extenſive production of ſuch, to the benefit of the trade and commerce of this kingdom.

N. B. No premium will in any caſe be given, unleſs the performance be deemed by the Society to have ſufficient merit to deſerve encouragement; and the Society reſerve to themſelves the power of giving in all caſes ſuch part only

only of any premium as the performance ſhall be judged to deſerve.

It is required, in all caſes where it can be done, that the matters for which premiums are offered, be delivered in without names, or any intimation to whom they belong, that each particular thing be marked in what manner each claimant thinks fit, he or ſhe ſending with it a paper ſealed up, having on the outſide a correſponding mark, and on the inſide the claimant's name and addreſs.

No papers ſhall be opened but ſuch as gain premiums, all the reſt ſhall be returned unopened, with the matters to which they belong, if enquired after by their marks within two years; after which time, if not demanded, they ſhall be publickly burnt unopened, at ſome meeting of the Society.

Whereas there are ſocieties for the encouragement of arts, manufactures, and commerce, in that part of Great Britain called Scotland, and alſo in Ireland; therefore all the premiums of this Society are deſigned for that part of Great Britain called England, the dominion of Wales, and town of Berwick upon Tweed, unleſs expreſsly mentioned to the contrary; and the claims ſhall be determined as ſoon as poſſible after the delivery of the ſpecimens. Proper affidavits of ſuch certificates as the Society ſhall require, are to be produced on every article.

All matters, for which the Society propoſes premiums, muſt be begun after the publication of ſuch premiums, unleſs there be a particular exception in the ſaid publication.

No perſon will be admitted a candidate for any premium offered by the Society, who has obtained a patent for the excluſive right of making or performing any thing for which ſuch premium is offered.

A candidate for a premium, or perſon applying for a bounty, being detected in any diſingenuous methods to impoſe on the Society, ſhall forfeit any ſuch premium or bounty, and be deemed incapable of obtaining any for the future.

Note, Any information or advice, that may forward the deſigns of this Society for the public good, will be received thankfully, and duly conſidered, if communicated by a letter directed to Dr. Templeman, the ſecretary, at the Society's office, oppoſite Beaufort Buildings, in the Strand, LONDON.

Claims to be made, and Certificates to be brought in, on or before,

Anno 1766.

Novem. 1ſt. Tueſday.	ACORNS. Cheſnuts. Elm. Carrots. Parſnips. Machine for ſlicing turneps. Madder.
2d. Tueſday.	Drawings of landſcapes. Etchings. Metzotintos. Engraving landſcapes. Intaglios.
Laſt Tueſday.	Drawings of human figure.
2d. Wedneſday.	Wild Madder.
December 1ſt.	Certified ſamples of graſs ſeeds.
1ſt. Tueſday.	Dying yarn green and yellow. Drawings at the duke of Richmond's gallery. Culture of wheat, rye, &c. Accounts of.
2d. Tueſday.	Dying ſilk in grain. Ditto cotton or linen yarn. Fine broad cloth fit for the Southern markets.
25th.	Iron from black ſand of America.
1ſt. Wedneſday.	Machine for draining lands.

31ſt.	Pearl-aſh from America. Silk Cocoons. Raw ſilk. Salt-petre from America.

Anno 1767.

January 1ſt.	Scammony. Cobalt in America.
1ſt. Tueſday.	Subſtitute for borax. Knitting mitts. Fine linen yarn.
2d. Tueſday.	Drawings of beaſts, birds, &c. Drawings of fruit, flowers, &c. Drawings of patterns for weavers.
Laſt Tueſday.	Fir. Lord Weymouth's pine.
Feb. 1ſt. Tueſday.	Drawings at the academy. Baſſo relievos in clay. Models in clay and wax. Bronzes.
Laſt Wedneſday.	Parſley.
Mar. 1ſt. Tueſday.	Honorary premiums for drawings. Improvement in wheel-carriages.
2d. Tueſday.	Landſcape paintings.
3d. Tueſday.	Sal ammoniac.
Laſt Tueſday.	Statues and baſſo relievos in marble.
3d. Saturday.	Turnep cabbage.
April 1ſt.	Barilla.
25th.	Cochineal.

May 1ſt. Tueſday.	Machine for extracting water out of ſhips.
Nov. 1ſt. Tueſday.	Acorns. Cheſnuts. Elm. Carrots. Parſnips. Madder.
December 1ſt.	Graſs ſeeds gathered by hand.
Laſt Tueſday.	Watch fuſee chains.

NUMBER LIII.

Obſervations on the Structure and Manner of Uſe of the Spiky Roller, *by Mr.* Randall.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN your *Muſeum* for laſt December, I obſerve my name mentioned concerning the ſpiky roller. Without making any comment on the Clay Farmer's dimenſions, for conſtructing this implement of huſbandry, I beg leave to tell him *, and the reſt of your readers, that the length of

* We are greatly obliged to Mr. Randall, for communicating to us what, on his great experience of this moſt uſeful implement of huſbandry, he finds to be the beſt proportion, and conſtruction of it. We think it an addition to the obligation the public lies under to him, of being, in fact, the *inventor of it*. For the introduction into uſe of ſuch an inſtrument, though a looſe hint of it might be found in ſome corner of an author, certainly carries with it the merit of an invention.

This account of the dimenſions of the ſpiky roller, will ſerve as a general ſtandard for the proportions of the inſtrument: but, doubtleſs, the abſolute magnitude of the roller, and length, or perhaps form, of the ſpikes, *&c.* may be varied with advantage, according to the texture and conſiſtence of the ſoil, on which the roller is employed. Very ſtiff land, which is a real ſtrong clay, will certainly coaleſce into larger and more tenacious and hard clods, than ground, which is leſs ſtiff, and, though ſtill

of mine, which was the firſt I ever ſaw or heard of, except what the late Mr. Ellis mentioned to ſo little purpoſe, was ſeven feet, the diameters of the ends eighteen inches, and the whole cylinder made of the heart of oak: and when the irons were burnt in, and the man ſeated on the box deſigned for that purpoſe, the weight of the whole was about a ton. But you will think it ſtrange, that the blunt end of the irons were oppoſed to the clods, and run more taper, till they came to the ſurface of the cylinder, into which the irons were burnt, and inſerted about three inches: which was their length above the ſurface of the roller, and which, I always found, very ſufficient to cruſh the hardeſt clod that ever came in their way. Had I, indeed, attempted to go on the ground, when the ſoil was not perfectly dry, this poſition of the irons would have carried the clods round with the roller; for it is not its province to ſqueeze but cruſh. Nor indeed can a man do more harm to his ground, than going upon it, when it is

clayey, approaches more to the nature of loam; and conſequently it will require a greater weight to cruſh, and longer ſpikes to penetrate and divide the clots. The roller, therefore, ſhould certainly be adapted to the quality of the ſoil, as to ſtiffneſs or looſeneſs: for wherever weight, and the length of ſpikes, can be ſpared, not only the original expence will be diminiſhed more than in a direct proportion; but leſs force will be required for the working the roller: which is a ſtill more material conſideration. It is to be hoped, that an implement, ſo obviouſly beneficial in all ſtiff clayey countries, will ſoon be generally adopted, at leaſt by gentlemen, who perſue improvements in huſbandry: and that a more extenſive practice with it, will ſhow what are the extreme proportions, from the greateſt magnitude required in the moſt tenacious ground, to the leaſt that will be ſufficient for the lighteſt, where ſuch an inſtrument can be at all uſeful. The communications of what may thus appear, will be a great advantage to the public; as it will tend to the quicker introduction of the uſe of this roller among farmers, and thoſe whoſe circumſtances do not admit of diſburſements for precarious and ſpeculative purpoſes: but who would, nevertheleſs, be very ready to ſave the expence of clotting, and prevent the hazard of ſometimes loſing the ſeaſon for ſowing, by the purchaſing of an inſtrument, of which the efficacy, as to thoſe points, was certain. E. O.

not

not quite dry, with a roller, conſtructed according to the Clay Farmer's form and ſize of the irons; or by that which I have recommended. I am ſenſible, thoſe, who conſtruct the roller, according to the Clay Farmer's directions, imagine, that by inverting the ſhape, there is leſs danger of carrying the moiſt clods round with the roller: but, I muſt ſay again, there is no occaſion for this precaution: for, if the other form be at all neceſſary, it muſt be in the moiſt ſtate of the ground: which is the only reaſon, we ſhould keep the roller off the ſoil. I had the irons fixed in four inches aſunder, in the firſt row, from end to end. The ſecond row began juſt between the firſt and ſecond irons of the firſt row. The third row was like the firſt; and the fourth like the ſecond. Then alternately for the whole ſurface of the cylinder, as near as could be, the irons were four inches aſunder in each individual row, and four inches from row to row, as nearly as the ſuperficies of the cylinder would permit. I do not know how to convey a juſter idea to your readers of the ſhape of the irons, than to call them Ox-harrow-teeth. For when I ſent for the workman, I deſired him to make ſo many of this denomination; ſix inches in length; and burn the ſmall end three inches into the wood: he went from me, as perfectly underſtanding what I meant; brought his number of irons; and inſerted them a proper depth into the cylinder. If ſome of your South-Country readers ſhould be at a loſs to know what is meant by ox-harrow-teeth, they will be pleaſed to remember, that they are irons faſtened into two harrows, which are drawn by either four oxen and two horſes, or ſix oxen alone, in very ſtiff ſoils. Now, it will appear to you, that the roller itſelf, and one harrow, will require at leaſt four able horſes, according to the Clay Farmer's ſtating the caſe: but my roller, without harrows, always ſtood in need of three ſtout horſes, which the man, from his box, always drove a-breaſt, for the greater convenience of turning on the land's ends. But were I to have two ox-harrows, (which would only extend the length of the roller) following

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ing the roller, for the purpoſe of tearing up clods, in order to be cruſhed, on going a ſecond time over the ſame, ſeven feet in length, I ſhould be obliged to have a much ſtronger team than four ſtout horſes; and, therefore, I muſt beg leave to obſerve, for this, an unanſwerable reaſon, that harrows are better omitted; as they always were, by my people, who ſet in with their ploughs, and turned up the ſoil from all requiſite depths, in order to have it cruſhed by the roller going twice in a place.

If the Clay Farmer will not take it amiſs, I would tell him, that wheels to the roller only create expence and trouble. For I do not remember we ever had any diſadvantage from the weight of them in my four rollers, made for near a thouſand acres of land, of all denominations of ſoils, ſtiff and light: for, when the fellows had occaſion to convey the roller from one incloſure to another, and ſometimes over the hard high road, I never heard, or obſerved, there was the leaſt difficulty of doing it: as the irons were ſo ſtout, as not to receive any injury in the paſſage, otherwiſe than by friction; by which they would be indeed in time ſomewhat impaired. As to the width of the gates, I think there was never any ſtoppage; ſince the men, when they found the paſſage rather too ſtrait, could, by turning the horſes heads, eaſily incline the roller on one ſide, and by that means wriggle it in, where it was too long for entrance. Let who will be the *father*, or *grandfather* of this valuable inſtrument of huſbandry, I had reaſon to be extremely well pleaſed with my lucky hit, in conſtructing it from Mr. Eliis's barely mentioning a ſpiky roller: though, from his uſual giddineſs, he gave his readers no more than the name. As it is of conſequence to the world, to keep the expence * of this inſtrument

* The cheapneſs of every implement of huſbandry, of a more complex nature, is a capital part of its merit, as it conduces, according to Mr. Randall's very juſt obſervation, to render its uſe general. It is with ſatisfaction, therefore, we find the ſpiky roller, according to his conſtruction, can be managed without wheels.

ment as low as poſſible, I ſhall be very ſorry to hear any more of wheels; for it may deter farmers from uſing it; and without their hearty concurrence, all will be only playing at farming. Gentlemen may pleaſe themſelves in every variation of the implements, and modes of culture: but without the aſſiſtance of thoſe, who bleſs the nation with their endleſs toil, a thouſand years hence will be as to-morrow. I heartily wiſh you may ſucceed in endeavouring to prevail on all your correſpondents, to ſign their real names to their eſſays: as that will greatly promote agriculture; and remove the appearance of vanity: and that you will likewiſe recommend it to them to avoid all altercations *: as this may diſcourage ſome of the beſt friends

wheels. This convenience in it, muſt be imputed to the ſpikes being made with very blunt ends; which prevents their penetrating into, and tearing up the road, or any other even ground over which the roller paſſes: as their great ſtrength, likewiſe, ſaves them, from being turned or broken. The Clay Farmer, therefore, might, according to the tapering and pointed form of the ſpikes of his roller, find occaſion for wheels: and indeed it ſeems, as if great inconveniencies would reſult, from the want of them, where the ſpikes are ſharp, and conſequently diſpoſed to penetrate into, and fix themſelves, in the ground, where the ſurface is level and firm. Not only the reaſon of the thing itſelf; but the clearneſs, and ingenuity, with which the writer of the Clay Farmer's letter delivered his brief account, diſpoſe us to think, he did not miſtake in this point, and add the wheels without having experienced ſome juſt ground for it. But both theſe opinions, though at firſt ſeemingly contradictory, are, in reality, very reconcileable, from the difference of the two rollers in this particular. For where the ſpikes are very thick ſet, and the ends extremely blunt, or rather broad, the roller may paſs on, as an even cylinder would, without piercing the level firm ground. Whereas, on the other hand, where the ſpikes are ſo ſharp, that the weight of the roller muſt of courſe make them penetrate, it muſt certainly require to be borne up from the ground; and moved forwards, by means of ſome proper carriage, and wheels, when it is not intended to act: otherwiſe it would both tear up the ground injuriouſly; and ſuffer great damage itſelf. R.

*. If Mr. Randall be a conſtant reader of our *Muſeum*, he may have obſerved, that there is very little reaſon for any complaints,

friends to agriculture, from engaging in your uſeful undertaking. I do not mean, by this, that nobody muſt make any replies, to what you inſert: but that it may be done, as people engaged in the ſame noble cauſe, without any touch of pride or oſtentation. For ſome of your readers are like the ſenſitive plant; which recoils on the approach of too rough an application.

I am, GENTLEMEN,

York, Your moſt obedient ſervant,

May 24, 1766. J. RANDALL.

NUMBER LIV.

Obſervations on the Importance of planting quick-growing Trees; and on the Nature and Uſe of ſeveral particular Kinds.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

THE ſubject of wood and timber hath been but little noticed during the publication of theſe papers: though it appears a matter of ſome importance to every head of a family in particular, when conſidered as wanted

on this account, in the laſt five or ſix numbers. We have, ſince that time, taken the liberty of ſuppreſſing whatever had a tendency to any thing of this kind: and if ſome particular gentlemen ſhould think it extraordinary, that we have omitted, or ſoftened expreſſions they might ſuppoſe allowable, they would certainly excuſe us, if they knew, in what manner, we had done the ſame to others, who had made attacks on them. It is certainly not the office of this work, to expoſe perſons; or cheriſh diſputes among particulars: but to bring to light, and diffuſe the knowledge of unknown truths, and material facts: and though, in the progreſs of this, *opinions* may with propriety be canvaſſed, contradicted, and even confuted; yet *men* ſhould not be reflected on, nor ſuffer any perſonal cenſure. Neither Mr. Randall, therefore, nor any other gentleman, need, for the future, fear any diſagreeable comments of this kind: but may deliver their notions with a full ſecurity, that if they were really as he ſays delicate as *the ſenſitive plant*, they will not be ſhockt *by the approach of too rough an application*. E. O.

for

for fuel, building, or fences; and of much greater to the public, when its general utility to a maritime ſtate comes under our notice.—Conſiderations of this kind, I make no doubt, were the principal motives, which induced the Society of Arts, Manufactures, and Commerce, to propoſe honorary premiums for the propagation thereof: and which, with an emulation in ſome noble-ſpirited perſons to do ſomething for the benefit of futurity, have given being to a great many plantations, deſigned ſolely for timber. If to this, be added the preſent taſte for pleaſure ground, in which many trees of the foreſt kind are diſperſedly planted, it is very probable our ſucceſſors may reap conſiderable profit from the ſpirit and amuſement of their predeceſſors.

But notwithſtanding this, it is a very great chance, whether great part of theſe promiſing plantations may not fall ſhort of the probable advantage, which might accrue from them, for want of due attention in the proprietors to the conſequences of the ſingle article of *lopping*. The improper practice of this hath ſpoiled, not to ſay deſtroyed, more timber than the navy of Great Britain hath conſumed.

For what is more evident than this, when, in moſt incloſed countries, we ſee the trees of every ſpecies of timber beheaded, at about ten or twelve feet from the ground, if ſeeming likely to ſpread their heads; or elſe ſharped up, if inclined to be more aſpiring, as ſoon as they become of ſize ſufficient to bear the weight of a man.

The *firſt* of theſe operations is certain deſtruction to all knee timber, and crooks for the ſhip carpenter: ſuch trees being afterwards commonly lopped, as often as the boughs become of ſize large enough for faggot-wood. And the *ſecond* is deſtruction to boards, planks, and quarter: becauſe, at every limb, which has been cut off, there will be a defect, when the tree overgrows the wound: as there never will be any union between the dead knot, and the living knot, which overgrows it.

Beſides theſe evident failures, in quantity and goodneſs, the trees, thus diſmembered, never grow ſo faſt, as thoſe

which happen to eſcape: but are generally ſmall, knotty, and defective.

I am aware of an objection, that will naturally ariſe. Some may ſay, What muſt be done for fuel, where coals, or peat, are remote, if none of the trees in the hedge-rows or woods muſt be lopped? To ſuch, I would give this anſwer, That, in every county, ſome ſorts of wood, of quick growth, which will do very well for fuel, may be raiſed. Such as the white poplar, or abele, alder, many kinds of willow, and the aſp or trembling poplar, in moiſt lands: the aſh, hazle, birch, maple, ſycamore, and elm, in dry, gravelly, ſtony, or loamy lands; and the broad-leaved brown willow, on mountains. This laſt defies the blaſts of weſtern winds. Plantations of it ſhould be encouraged purpoſely for fuel: and while they are growing to maturity, ſufficient to anſwer the demand, the trees already polled, will furniſh a ſupply. The young trees, of ſpontaneous growth, together with ſuch others, as are the production of modern plantations, whoſe youth hath rendered them unfit to bear the weight of the labourer, ſhould be left to maturate their promiſing timber, undiſturbed in a healthful and flouriſhing ſtate.

I would not be underſtood hereby, not to admit any under boughs of trees to be taken off. For it is conſiſtent with reaſon, that young trees ought not to be over-burthened with heads: but in cutting ſuch boughs, I find, by obſervation, it is beſt to cut them about twelve inches from the trunk; by which means they generally remain many years alive, though not productive of much ſhoot: and, in this ſtate, the body of the tree unites with them, as it ſwells by vegetation, ſo that no dead wound will be in the timber afterwards.

Since my reducing the foregoing hints to writing, an ingenious correſpondent, who ſigns himſelf Philoſylva, hath favoured your collection, with two pieces on theſe ſubjects; both of which are well worthy the notice of the public. In one of them, No. 43. Vol. VI. is recommended the planting of *Lombardy* and *Carolina poplars*:

and in a former the willow, called by that correſpondent, the *Norfolk willow*: but, in theſe weſtern parts, the Dutch willow: reſpecting each of which, I beg leave to make ſome remarks, founded on my own obſervation.

The Lombardy poplar I take to be the white poplar *, or abele of Parkinſon, page 1410. Becauſe, from what

* The white poplar is a tree of great value; and has all the good qualities aſcribed to it by Ruricola; both with regard to its quick growth, and the ſoundneſs and beauty of its wood. It is not, however, the ſame kind of tree, with the *Lombardy* or *Italian poplar:* nor is, we have great reaſon to believe, nearly equal to it in the rapidity, as it may be called, of growth. Philoſylva, in ſpeaking of it in the letter, referred to by Agricola, had a retroſpection to another letter on this particular ſubject, publiſhed in a former number, giving a deſcription of the tree, and an account of its late introduction into France. Both Philoſylva, and the ingenious author of that other letter, are, as we have great reaſon to preſume, much too well acquainted with matters of this kind, to fall into ſuch miſtakes, as the ſuppoſing the abele, or white poplar, to be a kind of tree not yet brought into our country; as is there ſaid to be the caſe of this: and, moreover, the ſpecies here called the Lombardy kind, though not hitherto brought into our country, is, nevertheleſs, well known to many gentlemen intelligent in botany, who have ſeen it in Italy or France. The Marquis de Chambray, who has, as mentioned in that letter, taken great pains to introduce it lately into France, is well verſed in the nature of trees; and could not poſſibly imagine the white poplar, a tree common in his country, and long known there under the names of *peuplier blanc* and *peuplier a larges feuilles*, to be a new kind: the advertiſement of the public nurſery at Sens, from the Royal Society of agriculture at Paris, quoted in Philoſylva's letter, ſets forth likewiſe its being a new ſpecies: and Mr. Pelé de St. Maurice, a member of that body, ſays, "it is vaſtly ſuperior, in point of "benefit, to all the other kinds of poplars." From all theſe ſeveral authorities, there can remain no doubt but that the Lombardy poplar is, as yet, a ſtranger in this country; and that it greatly exceeds the white poplar in quickneſs of growth, and other material properties: otherwiſe the Pariſian Society, the Marquis de Chambray, and other improvers of agriculture in France, to whom the white poplar is familiarly known, would ſcarcely be ſo ardent, in recommending and propagating this tree. It were to be wiſhed, we had an opportunity of judging of this from our own obſervations, as ſuch trees are no where more wanted than in our country, under the preſent circumſtances. E. O.

I have obſerved, of its growth in this climate, I believe, what is ſaid (in the ſaid letter) of its ſurpriſing growth in the much warmer climate of Italy.—I have ſeen, in the northward parts of Herefordſhire, many of theſe in the ſtate of large timber trees, growing on a ſoil, where but few of the ſorts of our common timber trees would thrive: being a thin loamy ſurface, on a wet gravelly bottom. I have ſeen floors, and wainſcotting, made of boards of this wood; that looked very beautiful, both in colour and grain: and, on inquiry, found it was laſting.—In Wiltſhire, about Laycock, theſe trees are planted, with the Norfolk, alias Dutch willow: and are both headed down, to about ten feet, purpoſely to produce wood; being both of very quick growth. But the poplar exceeds the willow, in number and length of boughs.—Theſe trees are eaſily propagated by cuttings: which grow to admiration. I have ſeen growing, in a gentleman's plantation, at Frenchay, near Briſtol, the Carolina poplar, which make annual ſhoots of ſuch lengths, as it would be incredible to ſay. But, for two winters paſt, the tops of theſe ſhoots have died * for ſeveral feet downwards: a circumſtance, which renders this tree unfit for our climate. As thereby the limbs are retarded in progreſs; and become crooked. This tree is about four years old. The Lombardy, or white poplar, I take to be a very ſuitable tree for planting about Batterſea and Clapham. The ſoil

* The Carolina poplar is really poſſeſſed of that amazing celerity of growth, when planted in ſome ſoils, which Agricola here mentions: and, even in ſoils, which are not moiſt, it outſtrips, perhaps, any other known tree. This would certainly render it very advantageous to our country, as Philoſylva has obſerved, if it were better known; and more generally cultivated. The ſuppoſition, which Ruricola has obſerved, of its being a tender tree, and liable to loſe its tops, is merely the effect of ſome accident which happened to the trees he ſaw near Briſtol. For there are great numbers of this kind of poplar, in various plantations and nurſeries, which have never ſuffered in any ſeaſon: and, indeed, after they are firmly rooted, perhaps few kinds of trees are harder. We much wiſh to know the comparative merits of this and the Lombardy kind. E. O.

there-

thereabouts, being such as would well agree with it. The Norfolk, alias Dutch willow, would grow surprisingly in the meadows by the Thames side, if planted on the banks of ditches: and both, by being lopped every five or six years, would produce a profitable crop to the proprietors: though either will make tall trees *.

I am, GENTLEMEN, your's, &c.

May 23. RURICOLA GLOCESTRIS.

NUMBER LV.

An Inquiry relative to the Culture, &c. of Hemp: In a Letter from Mechanicus.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

PERHAPS the frequency of my writing upon subjects hitherto of little importance to the *public*, may be thought, by many of your correspondents, too trifling, to merit a place in the *Museum Rusticum*. Whenever, *gentlemen*, you view any of my letters in that light, I beg you will suppress, or at least postpone their publication: in order to make room for more useful matter. Whatever, *gentlemen*, you may adjudge to be their fate, I shall acquiesce with it; for certainly you must be the best judges

* We apprehend our good correspondent Ruricola is somewhat deceived in this particular: for both the abele and Norfolk willow, will grow to be large trees; and even vie with most of the forest kinds. The Norfolk willow is, perhaps, the largest of the willow tribe: but the *bright swallow-tailed willow* has sometimes attained such size, that Mr. North mentions, in his account of the Norfolk willow, inserted in Philosylva's letter above quoted by Agricola, he knew of two willow trees, which he believed to be the swallow-tailed willow, that sold for fifteen pounds. Certainly these trees must have been of a very considerable size; or they could not have produced so great a price as seven pounds ten shillings each. E. O.

of

of what ſuits your deſign.—The very great regard I have always entertained for the *Muſeum Ruſticum*, like the fond enamoured votary for his miſtreſs, gives me a kind of an *eager deſire* of paying my devotions, by ſcribbling as often as I have leiſure, which moſtly happens on the *Sabbath-day*, for want of other opportunities. When *bigotry*, *ignorance*, and *ſuperſtition*, uſurped the place of reaſon, it might have been termed an *heretical profanation of the Sabbath*; I hope, *gentlemen*, in theſe more enlightened days, it will be allowed, that by ſuch a practice, I do not much tranſgreſs either the divine or human laws: if, by ſo doing, I can promote the welfare of mankind, and make the leaſt addition to uſeful knowledge, that has either an immediate or more remote tendency to it, I am in ſome degree (I hope) diſcharging my duty. For moſt, I believe, will allow, that the chief and ultimate end of *true religion is the promoting human happineſs*; if ſo, every man, who promotes human felicity, has certainly a juſt claim to favour and protection, both from the divine and human inſtitutions, eſpecially, in a country, where liberty and reaſon are inſeparable companions, and claim a legal ſettlement. I cannot prevent myſelf on this occaſion from reciting, an energic, and to me, harmonious couplet, of that celebrated poet, Mr. Pope.

> For modes of faith, let graceleſs zealots fight;
> His can't be wrong, whoſe life is in the right.

An abrupt tranſition from ethics, which, I confeſs to be an intruſion, and foreign to your plan, may ſeem an odd contraſt: eſpecially, when the article *hemp* appears to be the ſubject of my inquiry. I am very ſure that this uſeful *domeſtick vegetable*, deſerves to have more notice and regard paid to it, than hitherto it has met with in this part of Staffordſhire, where it is confined to the corners of gardens, or ſmall * hempbutts.—I have looked over the table

* The cultivation of hemp in Great Britain is certainly a ſpecious object; when we conſider the great conſequence it is of as

ble of contents of all the five volumes of the *Muſeum Ruſticum*; and cannot find, that it hath, in that uſeful work, yet been the ſubject of conſideration.—I only found that a correſpondent, who ſigns himſelf a Subſcriber, ſee Vol. II. No. 13, propoſes it as a ſubject of inquiry, and you, *gentlemen*, in a note to the ſame letter, deſire ſome of your corre-

as well with reſpect to our maritime concerns, as many other uſes: and that, moreover, we pay very great ſums for it to Ruſſia, and other north-caſtern countries. But when, on the other hand, we take in various particulars relative to our preſent circumſtances, we may doubt whether the culture be not an improper ſubject of perſuit; unleſs in a limited manner, and peculiar ſituations. It is certain, that hemp was once more cultivated in Great Britain than at preſent: and it will throw ſome very material lights on the matter, to examine why the culture of it is now diminiſhed. The reſult of ſuch an inquiry will be this ſimple anſwer, that the cultivation of corn, became more profitable than that of hemp: and was, therefore, ſubſtituted in its place. If it be further aſked, why this is ſo? The anſwer may be, that hemp very ſoon impoveriſhes the ground, on which it is raiſed: and requires, therefore, either to have freſh land broken up for it; or a conſiderable proportion of manure to keep up that, on which it has been before raiſed. Since, therefore, manure became dear, by the extenſion of the tillage of corn, or other articles which increaſed the conſumption of it, the produce of hemp would not afford to pay for it: and the cultivation was accordingly of courſe diſcontinued, except in ſome peculiarly favourable ſoils, or in ſuch quantities, as would require only the manure which could be ſpared from corn, *&c.* in particular places.

The above principle prevails ſo far, that the Society for promoting Arts, *&c.* who appropriated ſeven hundred pounds, for ſeveral ſucceſſive years, for premiums for hemp in England, could not, in the leaſt, promote the growth of it: but had, perhaps, fewer claimants at laſt, than when they firſt made the offer.

The culture of hemp muſt, therefore, be confined to places where the ſoil is particularly adapted to it, with the aid of only a ſmall proportion of manure; or to a ſmall quantity, where ſome manure can be with convenience ſpared from the other demands of a farm. In the latter caſe, an acre, or two, will ſometimes be of great ſervice: where there are ſpare hands, that can dreſs and manufacture it in the winter: and by ſuch means make a return of profit into the family, for the time, ſuch hand would otherwiſe gain nothing.

In

correſpondents, to communicate a full and ſatisfactory anſwer, to this ſenſible *gentleman*'s important queſtion.—As I have not yet ſeen any anſwer thereto, relative to the *culture* of *hemp*, I humbly join with you, and that *gentleman*, in this * requeſt, that ſome one of your many *contributors*, who are acquainted with its cultivatton, will condeſcend to oblige me, and the public, with a compleat ſet of directions, in every neceſſary article reſpecting its cultivation; the properties, and management of the ſoil; the quantity of ſeed proper to ſow a ſtatute acre; and ſome plain directions, if they can be verbally given, how to diſtinguiſh good ſeed. For, I ſuppoſe, a judicious choice of ſeed to be a very neceſſary article towards inſuring ſucceſs.

I am, GENTLEMEN,

Your obedient humble ſervant,

MECHANICUS.

In this limited light, muſt the culture of hemp be regarded in England. But to our American colonies, who have freſh ground without bounds, muſt we look for the ſaving, that is to be made in the balance of trade, with regard to this article. E. O.

* The compliance with Mechanicus's requeſt, of communicating the beſt method of cultivating and dreſſing hemp, may, however, not only be of ſome benefit here, but conduce to the improvement of that article, in America; where ſuch knowledge is much wanted. E. O.

Muſeum Ruſticum, &c.

For JUNE, 1766.

VOLUME the SIXTH.

NUMBER LVI.

Obſervations on the Cultivation and Uſe of Lucern in Picardy.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS I gave you ſome account of the propagation of lucern, ſo far as a trifling experiment made thereon, under my own eye in England, would admit, it may not be unacceptable to many of your readers, (notwithſtanding ſo much has been ſaid about it already) to give them ſome account of this uſeful plant; and the manner of propagating it in France.

I have, between the fifteenth and twenty-fifth of May, travelled through the towns of St. Omer, Capel, Liſle, Douay, Cambray, and many ſmall villages; and having my own horſes, and finding, at all theſe towns, lucern in abundance, I have fed them with nothing elſe. At the village from whence this letter is dated, I lay at the houſe of a ſenſible farmer, from whom I collected the following

particulars. He ſays, at this time, the firſt crop is in perfection: which is about two feet high, and very full of leaf; but without bloſſom. About a month hence a ſecond crop will be fit to cut, equal in goodneſs to the firſt: and in November a third, but much ſhorter, and inferior to the two former. That it makes excellent hay; and is a moſt advantageous and uſeful plant. They generally chooſe low marſhy ground, to ſow it in; and, when it firſt appears above ground, they ſet the peaſants to dance upon it, (that was his expreſſion): but I ſuppoſe, rolling it to ſecure the root in the ground, is all that is neceſſary. They never turn the cattle into the field, to eat it from the earth: but fetch it home tied up in ſmall bundles. Indeed it is evident enough, that cattle turned in to graze upon a plant two feet high, muſt, by that means, deſtroy much more than they eat. What difference the climate or ſoil of this country may create, ſo as to render the propagation of lucern in England leſs beneficial than in France, I am not a competent judge of. But certainly, if neither of theſe are an impediment, it muſt be highly worthy the attention and cultivation of the Engliſh farmer.

In this country, where there is *no land without aid*, there is not to be ſeen the ſmalleſt ſpot uncultivated! In our fertile iſle, how many thouſand acres lye waſte! If, as I paſs further through this kingdom, any thing occurs, that I think may prove uſeful to your work, you ſhall hear * from me.

Gournay, in the Province of Picardy, May 25, 1766.

I am, GENTLEMEN, Yours, &c. P. T.

P. S. The farmer tells me, that moſt of the hay conſumed in Paris is lucern hay: and that abundance of lucern grows near that city.

* We are greatly obliged to *P. T.* for this offer: and wiſh much, that his example of making his travels ſubſervient to the public advantage, by obſervations on the agriculture and arts of the countries, he paſſes through, were imparted to the world in the ſame manner. E. O.

NUMBER LVII.

Account of the beſt Manner of cultivating and preparing Indigo in Carolina: *And of the Manner of cultivating of Indigo, Cotton, and Tobacco on the ſame Land in* China.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

AS I do not find any anſwer given to *Americus*'s enquiries, concerning the culture of the anil, or Indigo plant; and cotton ſhrub; as likewiſe the proceſs of making the Indigo from the plant; I have here ventured to ſend you ſuch obſervations, as my ſituation would permit me to make: with an account of the proceſs, and culture, as practiſed in Carolina, by a perſon, who (if I am rightly informed) excelled that whole province in making of the Indigo: having, ſome years before, lived among the French, as well as Spaniards: of whom he learned this method of making all the various ſorts mentioned.

The land, on which the Americans cultivate their Indigo, is what they here call *Up-land*; that is, land which lies above the level of the ſea, or any of the contiguous creeks or rivers, in Carolina. This ſort of land is much like that in China, in the ſame ſituation, in point of quality: being, for the moſt part, a thirſty gravel, with here and there a thin covering of hazel mould: which laſt is the land, the Americans always make choice of. They generally firſt break it up with the plough: and afterwards work it fine, with the hand-hoe. By the latter end of March they have it formed into little ridges, about eighteen inches aſunder, running north and ſouth as nearly as the ground will admit of. They then ſow the ſeed at two feet diſtance, by means of a dibble *, with which they make

* Mr. Miller, in his Dictionary, rightly obſerves, that the ſowing the Indigo might be very advantageouſly cultivated by

make the holes about three inches deep: and into each of them, they put about a dozen ſeeds, that are lightly covered by hand. After this, if the planter be ſo fortunate, as to be favoured with a little rain, the plants, in a few days, begin to make their appearance: after which, the ground requires hoeing and weeding: as, if it be a little while neglected, it will be ſoon over-run with weeds, that will in a great meaſure deſtroy the plants. But with care and management, as directed, the Indigo will be fit to cut about the middle of June: (which is their firſt crop.) This is performed with a ſharp inſtrument, with which they cut it as low as there are any leaves: obſerving to leave ſtanding, ſuch plants, as appear moſt luxuriant, in order to raiſe ſeed for another year. After this, they give the ground a good hoeing: and the plants ſhoot out new branches, that ſend forth freſh leaves; which they commonly let ſtand, as long as the ſeaſon will admit: of which they judge, by the falling of the loweſt leaves, that happens about the beginning of Auguſt.

I ſhall now proceed to the proceſs: which I ſhall give you *verbatim* as it came to me.

Cut the herb in the morning; and put it into the vats as ſoon as poſſible, in order to prevent its welting or heating: which are both prejudicial. Then pump at leaſt

the uſe of the drill-plough. There was one great impediment, till lately, to the uſe of the drill-plough, which was the difficulty of procuring ſuch an implement on a good conſtruction. For tho' many different kinds had been tried, yet they were all attended with conſiderable inconveniencies: and thoſe, which executed tolerably, were very liable to be out of order. But this obſtacle is now removed. For the Society for promoting arts, *&c.* have this year adjudged premiums to two different perſons, for the improvement of drill-ploughs: and both the kinds are ſimple, cheap, eaſily made, repaired, and appeared, on actual trial, by the committee, to anſwer the purpoſe perfectly well. Models of the real ploughs may, therefore, be eaſily had, by means of thoſe repoſited in the Society's collection of machines: and there can be no doubt, but that the uſe of them would anſwer perfectly well in the cultivation of Indigo, and occaſion a very great ſaving in the production of that valuable commodity. E. O.

three

three or four inches water, above the herb. Becauſe the waſh of this water cleanſes, and brings off with it the fine particles of Indigo: which might otherwiſe remain among the leaves. Bore a hole, with a ſmall gimblet, through the ſide of the ſteeper, about two inches from the bottom: which, ſtop lightly with a ſmall plug; ſo that there may be a continual dropping from it, down the ſide of the ſteeper. This trickling down the ſteeper, is the infallible rule, to know when the liquor is impregnated, and fit for the battery. After the herb has been in two hours, attention ſhould be given to this dropping; and a clean chip laid underneath for it to run over. This chip will be ſtained green; and the green colour will increaſe as the liquor ſtrengthens, till at laſt, you will ſee the edges of this little ſtream grow coppery: on which, you muſt immediately draw off: or your quality will be deſtroyed. This will be ſooner or later, according to the heat of the weather, or the quality of the water. It generally happens, from three and a half *, to four, five, or ſix hours, from the herb's being put in: but as the weather grows colder, this appearance will be later. The liquor ſhould run off of a bright green, intermixed with a yellow; of a golden colour, and bright. The water, on the top of the ſteep, ſhould have the ſame appearance, as when firſt put on the herb; and not be tinged with green: as that is a certain ſign of fermentation †; which when it happens, deſtroys

* Father Le Bat, who publiſhed in his voyages, an account of making Indigo in the French American iſlands, where he was ſome time reſident, ſays, The time of ſteeping ſhould be from ſix to twenty hours, according to the time the fermentation comes on, making that, inſtead of the appearances of the colour, as here directed, the criterion of the proper period. The reaſon of this difference, which is a very extraordinary one, we ſhall ſee in the note below. E. O.

† There is a very remarkable difference, betwixt this account, and Father Le Bat's, of the proper time of ſteeping the indigo: and the reaſon for it. Here four hours to ſix is ſaid to be ſufficient, and that above all things *fermentation* is to be avoided, as "it deſtroys the quality, and renders it abſolutely impoſſible

"to

deſtroys the quality in the ſteeper; and renders it abſolutely impoſſible, by any art, to bring it to life in the battery. The ſtems of the herb ſhould ſtain green, and not

" to bring it afterwards to life in the battery." Father Le Bat, on the other hand, declares five or ſix times that ſpace to be neceſſary: and that an actual and ſtrong *fermentation* ſhould be allowed, " till," as he ſays, " the effect of the fermentation ap-" pear; the fluid heat, and boil up on all ſides; and, the water, " which at firſt was clear, inſenſibly grow thick, and become " of a blue, inclining to a violet colour." The fermentation is aſſigned by him, as the cauſe of the production of the blue colour: and ſo it has been underſtood, by all other writers, and moſt other perſons, till now: as appears, indeed, from our correſpondent's own account of his neighbour's notions, below given, as expreſſed in their proverbial maxim, of *ſteep ſoundly, and beat roundly*. Without allowing this to be the principle; we muſt admit the colouring matter, or ſubſtance of the Indigo pigment, to exiſt natively in the plant: and then it is very difficult to account for the comiſcibility with and ſolution in water: to which, without the medium of ſome putrefied matter, or the cauſtic alkali, experiments ſhew it to be extremely repugnant. It can only be explained thus, that the Indigo herb has a very great propenſity to ferment: and that it does ſo in a certain degree, even in the ſhort period of four or five hours, though not in ſuch as to ſhow itſelf by ebullition and heat: that the colouring matter does exiſt in a native ſtate in the plant, in a condition which renders it ſoluble in water, with the aid of a ſlight putrefaction in the concomitant ſubſtance of the plant: and that this inſenſible putrefaction, is ſufficient to burſt the veſſels of the plant, let looſe the colouring matter, and ſupply the neceſſary medium for combining it with the water: which, without the aid of ſome degree of putrefaction, cannot be effected. Premiſing theſe principles, certainly our correſpondent's method will produce a much finer kind of Indigo, than the other: though the product muſt be much leſs. For where a great part of the viſcid matter of the herb is commixt with the colouring matter, it muſt greatly deprave it: and Father Le Bat muſt have given an account of the manner of making coarſe Indigo only, ſuch as was moſtly produced at that time in the French iſlands: though the Spaniards did then, on the American continent, make ſome, that was very fine. It were much to be wiſhed, that our planters ſtrove to improve the quality rather than to increaſe the quantity, as they would not only find it ſoon anſwer, on account of the immediate greater price they would obtain for it; but as it would quickly tend to the excluſion of the French, or other Indigo, from our markets, E.O.

red,

red, as is commonly waited for. This is all that is needful to be done in the ſteeper: only obſerve, to keep the veſſel ſweet, and clean, by rinſing it well after every ſteeping. In order to this, when the week's work is done, throw out the herb immediately; and do not let it lie in the ſteeper till Monday; as is uſually the caſe, to prevent its leaking: but pump ſome clean water in its ſtead: or, depend on it, your next ſteeping will be loſt. For though it may produce very fine mud, and anſwer all the foregoing ſymptoms; yet, when dry, the produce will be little better than dirt.

Before we go to the battery, it will be neceſſary to inform the reader concerning the lime-water uſed in it. It is made, by ſteeping a quantity of unſlaked lime, in common ſoft water, diſcretionally: which, after ſome time ſoaking, is left to ſettle; and then drawn off clear from the lime. This lime-water ſhould be prepared before the ſteeping comes on; and that, in a conſiderable quantity, as you will ſee hereafter.

THE BATTERY, though leſs dangerous, is more curious. As it is impoſſible to bring the quality to life here, when killed in the ſteep; ſo it is almoſt impoſſible to kill it here, when put in alive. I have tried every experiment, I could think of, and ſtill a fine colour remained: ſometimes a fine copper; at others, a beautiful purple: and, when properly managed, the fine *flora*.

THE FINE COPPER is the product of beating without lime-water, till the fine green is changed to the purple, or violet; which generally happens in about two hours: and then, a little lime-water to ſettle it; though it will do without it.

THE FINE PURPLE is made, by beating from five to ten minutes; and then putting in lime-water ſparingly, till the green, as above, changes to the purple, or violet colour.

THE FINE FLORA, which is the moſt advantageous, is made in a different manner from either of the other ſorts: that is, as follows. Charge the battery with one-ſixth

of

of as much lime-water, as you have liquor in the ſteep; and watch carefully the infallible ſymptoms from the ſteep: on the appearance of which, draw off to the lime-water in the battery; which will increaſe the beauty of the colour. When you begin to work in the battery with your buckets, the drops which fall from them, look like beautiful green blowing flies. As ſoon as you begin beating, ſtart your lime plug again a little; and let it conſtantly run during the time of beating, in the manner the ſteep does at its laſt running: which may be out of a hole made with a ſpike gimblet. Continue beating till it is of a fine violet colour, on the top, without having any regard to the grains: for while they appear, you are not perfect. Grains will appear before you begin to beat, being collected by the lime-water: which is a good rule to govern the maker, in what proportion to put it in. The diſſolved matter being thus collected, are proof againſt all the aſſaults of the air; and the liquor, by beating, will come to its proper colour: which, to a curious maker, will be in about half an hour. When fully beaten, on the top of the water, is a fine violet caſt, and no appearance of grains, till it has been put by on ſome veſſel or plate, in a ſtill place, for four or five minutes. The thin flakes of water, that fall from the buckets, ſeem purple; and are occaſioned, only by the revolution of the fine blue appearing. It is a yellowiſh water, that is to come off when drawn: but the main body will ſtill be green. Draw off in the morning, or ſooner, if you have occaſion. The water, on the top of the battery, will then be a little green; but the bottom of a ſtraw colour. I now beat two hours: but have beat three quarters of an hour for trial; which produced a coarſe grain, but a fine blue, full of green ſpecks, which diſappeared in drying, and was ſaleable.

In ſhort, you cannot hurt it, in the battery; otherwiſe, than by letting in unſettled lime-water. I know it will be objected, by ſome, who will ſay, that by putting in lime-water too ſoon, they have ſpoiled their Indigo: which I deny.

deny. For their Indigo muſt have been ſpoiled in the ſteeper; and it proved ſo: as it could not ſtand the teſt. For which reaſon, moſt makers will not put it to the trial: but follow the old ſaying: *Steep ſoundly, and beat roundly:* and, after they have jumbled up * a parcel of corrupt filth, put in a little lime-water to ſubſide it: and produce what, when dry, can ſcarce be called Copper Indigo.

The Mud is dried in ſquare boxes, three inches deep, covered in the bottom with woollen cloth: which is again covered with Oſnaburg linens: and the boxes, being fixed, half way into the ground, in ſandy or gravelly ſoil, you may put in the mud, out of the battery: and it will ſoon drain and be fit for the preſs.

Thus far from my American friend. I ſhall now, without apologizing, give you, with all poſſible brevity, my own obſervations, made on the Chineſe culture of this plant; as I have ſeen practiſed on an iſland, contiguous to where the European ſhips lay at Canton: which is the only cultivated ſpot, we had the liberty of going on. Here we uſed to ſpend our leiſure hours, when the weather was ſeaſonable. As to the beauties of the ſpot, and the unparallelled induſtry of the Chineſe peaſants, I ſhall paſs them over: being too prolix; and foreign to my preſent ſubject: though truly worthy the imitation of my fellow countrymen. The firſt time I was on this delightful ſpot, it was in ſome places juſt cleared, of what is known to the Engliſh by the name of *Calaventias:* which is a ſpecies of

* This explains what our correſpondent meant above, in the expreſſion of bringing *to life again in the battery.* He clearly did not intend to have it underſtood, that Indigo cannot be produced at all, where a ſtrong fermentation of the herb is ſuffered, but that the finer kinds, the *purple,* and the *flora,* cannot be obtained in ſuch manner: though an inferior kind of the copper, as he allows here may. And this verifies our preceding obſervation, that the ſeeming contradiction, in facts, between Le Bat and him, is to be reconciled, by ſuppoſing that he has given an improved proceſs for making fine Indigo; and Le Bat, an account of that formerly practiſed in the French iſlands, which produced only a coarſe kind. E. O.

the *phaſcolus*, or kidney-bean. In other places, it was planted with the cotton ſhrub; which had ſucceeded the *Calaventias*. The ground being laid out in oblong ſquares, ſtretching north and ſouth, nearly. Such as lay low, had deep drains cut round every ſquare. The land, on the hill ſides, was made level, ſo as to retain all the moiſture that came on it; for which it ſeemed to have great occaſion: being a thirſty gravel full of ſmall ſtones. The low land was ſeemingly rich, though not deep in ſoil. This land was capable of being flooded at pleaſure, by a tide creek: but it was always kept dry when in this culture. Theſe little plantations were formed into ridges, the length of the ſquare, at ſuch diſtance, as to admit walking among the cotton, without doing it any injury, when in bloom. There ſtood a row of plants on each ridge, at about three feet diſtance from one another: and, between each of theſe plants, ſtood a ſmall plant or tuft of Indigo: which, in ſome places, was but juſt appearing: in others about three inches high: and the cotton was from half a foot, to a foot and half high. This was on the eighth of June. The land had been made exceſſive fine: and was clear of all manner of weeds. For I obſerved, there were ſervants, whoſe ſole buſineſs was, to look after it; and to deſtroy the vermin: particularly the cockroaches: for the catching of which, there were ſeveral traps, ſet on every patch. On the twenty-ſecond of the ſame month, I found all the reſt of the iſland planted with cotton, and Indigo, in the ſame form; which made a moſt beautiful appearance. For it ſtood in the niceſt order, I ever beheld; and ſcarce a weed to be found among it. That, which was firſt planted, was now beginning to flower: being from two to three feet high. The Indigo was about five or ſix inches high, with extreme ſmall ſtalks, like young clover; but vaſtly loaden with leaves; which it could ſcarce ſupport. The cotton flower is ſucceeded by a round pod, ſomething leſs than a wallnut, that, in a little time, burſts, and diſcloſes the cotton: which is plucked, juſt as is becomes ripe. The latter end of July, the land was

intirely

intirely cleared of the cotton: and I found ſmall ſets of tobacco, in their places: which I ſuppoſed to have been tranſplanted thither. The earth, having been firſt hoed towards the Indigo; which now appeared maſter of the field: but how long it remained, I cannot ſay. For it was the beginning of November before I could have an opportunity of paying my little paradiſe another viſit: when I found all thoſe tranſitory beauties were fled: and nought remained, but the roots of the tobacco; which ſtood in hillocks: the earth, as I fancied, having been hoed towards them on the cutting of the Indigo. The proceſs for making of which, I could not learn.

How far this ſort of culture would anſwer * in the weſtern part of the world, I know not: but ſhould think, if followed with the like aſſiduity, it could not fail of ſucceſs. As to the plants, I find, they have got more † than one or two ſorts in Carolina. For the Indigo, they cultivate, is a ſtronger ſort of plant than the Chineſe, I ſee: and there

* The double cropping land, though hitherto practiſed, by the Europeans, in but few inſtances, might certainly, in many caſes, be made to be of great benefit: not only on account of the double product obtained from the ſame expence of rent, tillage, &c.; but becauſe the two kinds of plants, may be ſo adapted to each other, as wholly to exclude weeds; and at the ſame time ſhade the ground, ſo as to prevent that too great exhalation and dryneſs, which in looſe ſoils is often a great diſadvantage, where plants grow in rows or drills. E. O.

† There are three kinds of the Indigo plant, which have been cultivated in the Britiſh dominions, for the making the pigment of that name. The Jamaica wild Indigo; the Guatimala Indigo; and the Carolina wild Indigo. But the Guatimala kind, is that, which has been moſtly uſed: though it has been ſaid by ſome perſons, who have made trials of it, that the firſt ſort, which will grow much larger, and thrive on poorer land, is on thoſe accounts more profitable; and will produce as good Indigo. There are, in the botannic collections of plants in England, three or four ſorts of the eaſtern ſpecies of Indigo: but it does not appear, that any of them have been carried to our American colonies, in order to their being tried as to their produce. It is very probable, however, that, among them, is the ſpecies, which our correſpondent here mentions, to have ſeen cultivated along with the cotton. E. O.

is, as I am told, an American ſort, which will ſtand their winters. But, as the excellency of the plant conſiſts in the multiplicity of the leaves, it is not in my power to determine, which may be the beſt. The cotton plant, I have been ſpeaking of, is, I underſtand, ſomewhat different from that cultivated in the weſt. But there is one thing more to be added in favour of the Chineſe culture, that by thus varying the kinds of plants, they can for ever keep their land in tillage. Whereas, in Carolina, this ſort of land is ſoon worn out; and the cultivator obliged to remove: and, further, the cotton ſeems to be intended as a ſhade, to the Indigo, from the meridian ſun: which would be too intenſe for that tender plant, in its infant ſtate.

As your truly laudable work ſeems to be calculated for the emolument of mankind in general, not forgetting the poor and indigent, I flatter myſelf, the matter I am going to inform them of, may not be unacceptable to ſome of your readers.

But to be brief. Buſineſs a few weeks paſt lead me into the country, where I took up my lodging at a tolerable inn. When, at ſupper, I was particularly pleaſed with the bread; which was not quite ſo fair, as the London bread, nor ſo light; but light enough, in my opinion, and moiſture: having, as I thought, a peculiar flavour. My landlord, on ſeeing me take ſuch particular notice of it, aſked me if I knew what it was made of? or if I could perceive any uncommon ingredient in it? On being anſwered in the negative, he told me, it was *potatoe bread*. The method of making which, is ſo ſimple, and ſo great a ſaving, that he ſays, he never intends to make any other: as it pleaſes his cuſtomers equally as well, as if it was all wheat. The method, he takes, is, to have the potatoes well boiled: and then peeled. After which, they are maſhed with a trencher; as for a potatoe pudding: adding thereto, the uſual quantity of barm, or yeaſt; which is ſtiffened with wheat flower; and, in all other reſpects, this is treated as common bread. The quantity of flour, in proportion to the uſual quantity, in the ſame ſized loaves,

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he could not exactly tell; but judged to be little more than one-third: it required a little longer baking than ordinary; but will keep much longer than wheaten bread. That which I saw, was between three and four days old. We had it toasted and buttered to breakfast: in which form, I thought it equally as good as before. The relief, which this bread might afford the poor, must be obvious to every one: and, as to the healthfulness of it, I think it needless to say any thing.

If this should be thought worthy a place in your publications, I shall venture to send you such sketches of American husbandry, as I shall judge worthy your notice. Though I am afraid, there are but few practices here, in that science, worthy the imitation of the English farmer.

I am, GENTLEMEN,

Your very humble servant,

WENSLEY-DALEAN.

NUMBER LVIII.

Account of the Construction and Use of two Horse-hoes, or Hoe-ploughs, laid before the Society for the Encouragement of Arts, &c. by the Inventor, W. Hewitt.

To the Society for the Encouragement of Arts, &c.

GENTLEMEN,

PERUSING the Essays on Husbandry, I observed particularly, that the author, page 105, expresseth hopes of seeing some "new-invented plough, cheap, simple, and "rightly calculated for *destroying weeds; keeping plants* "*clean; and stirring the ground:*" and, page 106, further says, "now as most people prefer useful, and cheap, to "elegant and expensive inventions, it is natural to wish "for a hoe-plough intirely simple, and not costly. For "the mechanism of those devised hitherto, by ingenious

"lovers

" lovers of agriculture, is of ſo perplexed, and compli-
" cate a nature, that it will no ways anſwer the com-
" mon purpoſes of huſbandry: but, being perpetually out
" of order, will throw the poor ploughman into deſpon-
" dency; and the rather, as neither he, nor the country
" plough-wright, can comprehend how to rectify any de-
" fects, or accidents, except with extreme difficulty."

The very name of a *hoe-plough*, ſuggeſted the idea of an inſtrument, which I ſhall call a horſe-hoe; whoſe conſtruction is intirely new, ſimple, and much leſs coſtly than a common plough. Such as country plough-wrights, and ſmiths, are able to make; and ſuch as common ploughmen are able to uſe: and which ſeems, according to the hopes of the aforeſaid author, to be rightly calculated for deſtroying weeds; keeping plants clean; and ſtirring the ground.

This horſe-hoe,—a model of which I beg leave, in the moſt reſpectful manner, to preſent to this honourable Society,—I hope may be of a very extenſive uſe in agriculture, as it muſt be much more efficacious, and expeditious too, than any kind of hand-hoes for the deſtruction of weeds, and ſtirring the ground *. For if the inſtrument does not cut below the crown, or head, of the roots, ſuch roots will ſprout again, and the firſt labour become fruitleſs; which indeed is too often the caſe of hand-hoeing: as the labourer, ſometimes, only ſcratches the ſurface of the earth, and ſhaves off the leaves of the weeds, the roots remaining intire and unhurt, to vegetate again. With this inſtrument, the huſbandman may hoe the ground ſo deep, that it will infallibly cut aſunder the roots of every weed, it meets with, below the crown or head; and, conſequently, either deſtroy them, or at leaſt greatly check their future growth that ſeaſon.

This inſtrument is calculated for hoeing the intervals between the generality of plants in ſtraight rows:—ſuch as tranſplanted lucerne,—beans,—peas,—and turneps, ſown

* Eſſays on Huſbandry, page 84.

with

with a drill-plough, &c. In large gardens,—hop grounds,—nurſeries,—and plantations of young trees, much labour and expence, in hand-hoeing, may probably be ſaved by the uſe of it.

In the county of Norfolk (and probably in many other places) the huſbandmen, in the months of March and April, preparing their lands for barley, generally give them a certain number of earths, according to the phraſe of that country; or, in other words, plough them a certain number of times. In thoſe months the weather is frequently very dry; and the ſoil being turned over and over again, and expoſed to the ſun and wind, becomes ſo duſty, that a great part of the ſeed will not grow without rain; which, ſometimes not falling in many weeks after the ſeed-time, cauſeth the crop to conſiſt of different growths: ſo that when the firſt grown corn is ripe for the ſcythe, the latter is but juſt eared. This evil, perhaps, may, in ſome meaſure, be remedied by the uſe of this horſe-hoe, inſtead of the common plough, at that ſeaſon. For this will ſtir, and looſen, the earth as effectually, as the other; and at the ſame time, neither remove, nor turn it over, which ſeems to be beneficial, in a drought, upon very light and ſandy ſoils.

With reſpect to foul ſummer fallows too, it may be of ſingular ſervice. The common plough buries the weeds, of which many grow again. This horſe-hoe will cut their roots aſunder, below the ſurface of the earth; and by leaving their foliage above it, expoſed to the ſummer ſun, the greateſt part of them will wither and die: ſo that they will not give the huſbandman much more trouble, the remaining part of the ſummer. And, as this hoe may be eighteen or twenty inches broad, two acres of land may be hoed by it, as ſoon as one acre can be ploughed, by the common plough.

This new inſtrument is intended for a public benefit; and to the conſideration of the public, as well as of this honourable Society in particular, it is freely ſubmitted. If it be judged an uſeful implement in huſbandry, well; if not,

not, the pleaſure that has ariſen from the hope of doing good, has amply rewarded, for his trouble, the inventor, who has the honour to ſubſcribe himſelf,

GENTLEMEN,

Hadleigh, April 19, 1766.

Your moſt humble, and obedient ſervant,

WILLIAM HEWITT.

P. S. Since I had compleated this model *, I apprehended, that its utility might be rendered ſtill farther extenſive,

* The Society, on receiving the former part of this letter, referred it to their committee of agriculture, who thought ſo well of the model, as to reſolve to have one of the ploughs executed in large by Mr. Pearce of Whitechapel; in order to have an actual trial of its operation, and efficacy; which is accordingly now finiſhed.

On being informed of this further invention, the Society reſolved to write to Mr. Hewitt, to ſend up, at their expence, one of the new kind in large, which is alſo arrived.

Both theſe will be tried, by the committee, the firſt opportunity: and the merits, and utility, of them, duly aſcertained. This method of proceeding in the Society, by actual trials, at their own expence, of the machines, or implements propoſed as improvements in huſbandry, cannot fail to be of the utmoſt ſervice to the public: as it not only decides the particular merits of ſuch machines, and implements, and encourages the invention of them; but alſo tends to aſcertain the principles on which the ſucceſs of ſuch inventions depend.

Along with the plough, Mr. Hewitt ſent the following information to the Society, of the effects and price of it.

"On Friday evening, I had the pleaſure of ſeeing an acre of "tranſplanted lucerne, belonging to Peter Newcome, Eſq; tho- "roughly hoed by this inſtrument in leſs time than three hours; "when and where it anſwered my warmeſt expectations. This "little lucerne incloſure is ſituated upon the ſide of a hill, and "is almoſt ſquare. The rows conſequently being ſhort, and "requiring very frequent turnings, retarded the progreſs of the "hoe. I mention theſe circumſtances in particular, becauſe, in "a plain field, one furlong long, an acre may be hoed in much "leſs time.—I have added a rake, which may oftentimes be "uſeful in ſcattering the *amputated weeds*. It is no eſſential part

tenſive, by a very ſmall alteration; therefore, gentlemen, I take the liberty of laying before you another model, calculated for hoeing the furrows between wheat ridges, which all farmers acknowledge to be very good huſbandry, though very many of them are deterred from the practice of it, for want of a cheap expeditious method of putting it in execution. An inſtrument of this kind, I am perſuaded, will very greatly expedite that uſeful work: and if it meets with your approbation, gentlemen, many lovers of improvement in agriculture may be induced to give it a fair and impartial trial.

" of the hoe, indeed, and may be uſed, or not uſed, at the di-
" rection of the huſbandman. This appendix is omitted in the
" ſmith's bill, who was ordered to make the horſe-hoe, at an
" expence not exceeding forty ſhillings.

A Copy of the Smith's Bill.

	l.	*s.*	*d.*
" A horſe-hoe — — — — —	0	10	6
" The ſide-irons and two bolts, weight 24lb. at fix-			
" pence a pound — — — — —	0	12	0
" Eight ſmall bolts and ſcrews — — —	0	2	8
" Two fers * for the wheel — — — —	0	0	8
" Four hoops for the ſame — — — —	0	1	4
" Two pins, two chains, and two ſtaples — —	0	1	0
" The wheel and handles — — — —	0	11	0
	1	19	2

" The ſame wheel, and ſide-irons, and even the handles,
" with a very little trouble, may be fixed to a variety of hoes of
" different ſizes."

* Two ſmall hoops within the nave of the wheel.

FIGURE I.

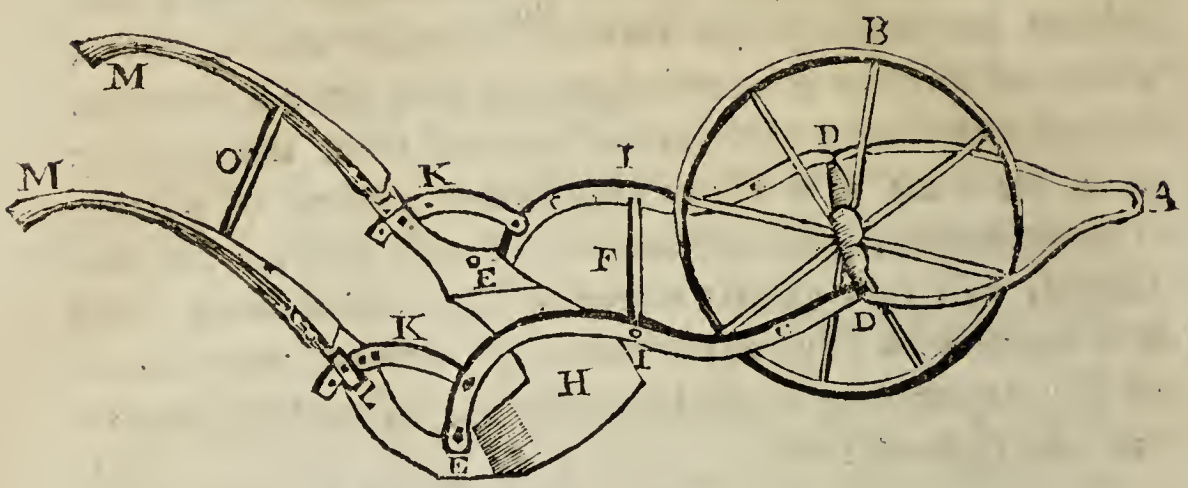
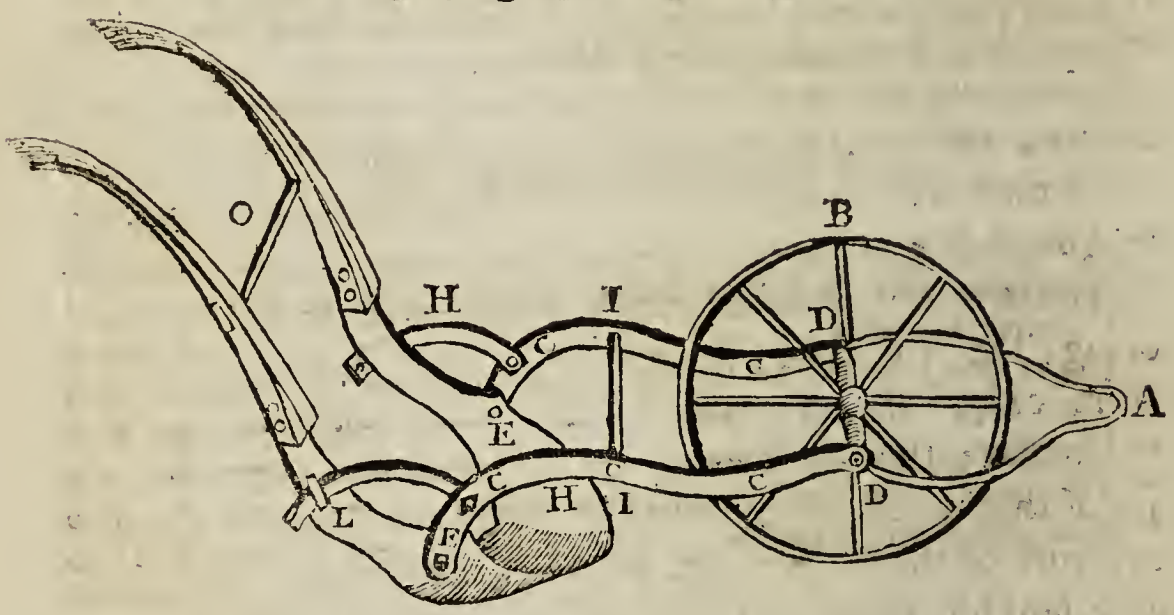


FIGURE II.



An Explanation of the Horſe-Hoe. Figure I.

A. repreſents a ſmall round curved iron bar, fixed upon each end of the axle of the wheel, by which the horſe-hoe is drawn.

B. the wheel three feet in diameter.

C c. two flat iron bars, three feet long, fixed upon the axle of the wheel, at D d. and to the ſides of the hoe; at E e. by bolts and ſkrews: upon theſe bolts, as well as the axle of the wheel, they are moveable.

F. a ſmall round iron bar, faſtened at each end, into the two bars; C c. (to ſtrengthen them), at G g. from and

to

to G. theſe bars may be ſtraight. From G. to E. let them be curved.

H. the hoe itſelf; the breadth of which may vary according to the different diſtances of the rows of plants, whoſe intervals are to be hoed.

K K. two little flat curved iron bars, fixed by bolts, upon which they are moveable, to the bars C c.—Each of them paſs through a ſtaple, fixed into the ſides of the hoe at L l. In both theſe, little bars, is a row of holes. In each of the ſtaples, is one hole; and, directly oppoſite to them, one hole in each of the ſides of the hoe: and, by means of two bolts, paſſing through theſe holes, and ſome of the holes in the bars K K. the hoe is fixed to any poſition; ſo that the ground may be hoed as near the ſurface, or as far below it, as is neceſſary.

M M. two wooden handles, fixed to the two ſides of the hoe, and to each other, by the croſs bar O; as long, and as high from the ground, as the handles of a common plough.

FIGURE II. repreſents the horſe-hoe, intended for hoeing the furrows, between wheat ridges: which differs only, in one reſpect from the other. That hoe is flat; this is curved. The breadth, and curvature of this, muſt depend intirely upon the breadth, and curvature of the furrows, to be hoed. In which reſpect, every ſenſible farmer can eaſily direct the ſmith how to form it. But, after all, if any perſons be inclined to make trial of this inſtrument, I would adviſe them not to truſt to a verbal deſcription, but to ſend for a model of it to Thomas Tillett, a very ingenious ſmith at Hadleigh in Suffolk.

NUMBER LIX.

Obſervations on the Structure, Uſe, and Expence, of public Granaries; in order to demonſtrate the Impracticability of erecting them in Great Britain; *and the conſequential Expedience of continuing the Bounty on Corn.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

HAVING, in my laſt letter, offered ſome reaſons for continuing the bounty upon corn exported, I thought it the leſs neceſſary to ſay any thing relating to public granaries, as the intention of them will be anſwered much better by the bounty, if that be ſhewn to be a right meaſure; and to ſtate the argument concerning granaries with ſome degree of clearneſs, required much too long a diſcuſſion. But ſince you deſire it, I ſhall now proceed to give the reaſons of my opinion, why ſuch granaries are not adviſeable in England.

The deſign of public granaries is to make corn cheap; and to keep it, as near as can be, to an equal price, that the inhabitants, particularly the poor, the labourer and manufacturer, may be ſupplied with plenty of bread at a moderate rate. The plan is highly commendable, humane, and public-ſpirited. It is neceſſary, in ſome countries, but would not be proper in England, for the following reaſons.

1ſt. On account of the great expence of erecting and managing ſuch granaries.

2dly. Becauſe the end propoſed, would not be obtained by them.

3dly. The example of other ſtates laying up corn in public granaries, does not prove the utility of them in England.

1. To

1. To form an idea of the expence of ſuch granaries, it will be neceſſary to examine ſome of thoſe in other countries, that are recommended for our imitation; ſuch as that at Schoonbank on the river Elbe; which is three hundred feet long, and eighteen feet wide within; has ſeven ſtories, each ſtory ſeven feet high, with a row of windows round each ſtory, to be opened in dry weather to air the corn, and blow the duſt out of it when turned. A path of a yard wide is left next the walls, all round the corn in each ſtory; and another path acroſs the middle, of two yards wide. In theſe are trap-doors, to let the corn run down from the upper to the lower ſtories, to ſcreen and air it: whence it is drawn up again with cranes, or other engines. Stoves are likewiſe to be placed in the middle, and at each end of the granary, to dry the corn in damp weather. At firſt the corn is to be laid about ſix inches thick on the floors, and to be often turned, aired, and ſcreened: in about a year it may be laid two feet thick; and the turning and ſcreening being continued at proper intervals, it may, at the end of two years, be laid two and a half, or three feet thick: and being by that time perfectly dry, turning it once a quarter, will keep it ſound many years.

This is the method propoſed for preſerving corn in England. But as we are aſſured, by M. Duhamel, in his treatiſe on the preſervation of corn, that they uſually lay it but eighteen inches thick in France, we cannot ſuppoſe it proper to lay it thicker in England, both on account of the greater moiſture of our climate, and quality of the corn, which in wet ſeaſons is not fully ripened in England, nor can it then be got in perfectly dry. And, though in hot dry climates, they lay it much thicker than in France: that is, becauſe their corn is perfectly ripened; and their wheat of a different ſpecies from ours. The Lammas, which is generally eſteemed in England, is a full plump fat grain; and, therefore, more difficult to be preſerved ſound: whereas, moſt of the foreign wheat, of the warmer countries that I have ſeen, is a drier and harder grain;

and

and ſuch were ſeveral parcels that I have received from Smyrna, Sicily, and Italy: being of the cone or bearded ſort.

It is, alſo, to be remarked, that the quantity, which can be kept in ſuch granaries, has been greatly over-reckoned. Mortimer has implicitly copied from Yarranton, and others from both, that ſuch a granary as the above, would contain fourteen thouſand quarters of corn. But a quarter, nine gallon meaſure, being 11.2 cubic feet, and each ſtory, after deducting the paths round and acroſs the middle, being only three thouſand four hundred and fifty-ſix ſquare feet, all the ſeven ſtories will contain no more than three thouſand two hundred and forty quarters of corn, laid eighteen inches thick; which is but about one-fourth of the quantity they have ſuppoſed. Mr. Dobbs is more moderate, when he reckons, in his Eſſay on the Trade of Ireland, that a granary of the above dimenſions will contain fourteen thouſand barrels; but he ſuppoſes the corn to be laid two and a half, or three feet thick. He calculates the expence of erecting ſuch a granary, built with bricks, and of a ſufficient thickneſs and ſtrength, at fifteen hundred pounds; and eight or ten pounds a year each to ſix men, to turn and ſcreen the corn, and forty pounds a year to a clerk. This calculation was made for Ireland about thirty-five years ago, but is much too low for England; eſpecially as ſuch granaries are erected near cities and populous towns, where materials and labour are dear: for the building would coſt conſiderably more in England, and the wages double: alſo the clerk would deſerve a ſuitable appointment for the care and conſtant attendance neceſſary in a buſineſs of ſuch truſt and importance; nor would one clerk and ſix men be ſufficient, to do all the buſineſs, and alſo to take in and deliver out the corn: and therefore the clerk and men, at a moderate reckoning, would coſt two hundred pounds a year.

But there is another article that Mr. Dobbs has omitted, which cannot, nor is it proper to be done by the clerk. One or more perſons muſt be employed to buy the corn;

which, at the rate of the uſual commiſſion for buying in private trade, will coſt one ſhilling *per* quarter: to this is to be added the expence of fuel, of repairs, intereſt of money, and alſo for the waſte of corn in drying and ſkreening, which, according to M. Duhamel's experiments, amounts to about a tenth part of the whole.

The expence of erecting granaries in France, is by this gentleman computed at a much higher rate than the above. For, he ſays, that a granary, to contain two thouſand ſeven hundred cubic feet of corn, which is about two hundred and fifty quarters, will coſt in France eight or nine hundred pounds. So that if the corn was bought at twenty-four ſhillings *per* quarter, the granary would coſt near three times as much as the corn contained in it.

The principal corn, to be preſerved in granaries, is wheat: of which, the quantity produced in England is uncertain. The author of the Eſſays on Huſbandry, computes the wheat-barley and rye, annually produced, at near fifteen millions of quarters, over and above what is uſed for feeding and fattening cattle, *&c.* and for malting, diſtilling, and ſeed: and, as probably about a third part of theſe crops is wheat, the quantity of wheat remaining for bread, and other domeſtic uſes, may be about five millions of quarters; and this would be the proviſion of wheat for a year, to be laid up in public granaries; beſides rye; and ſuch other ſorts of corn as might be kept for a ſhort time. But I ſhall ſtate a year's proviſion of wheat at no more than four millions of quarters, and charge nothing for keeping any other ſort of corn.

I do not find, that thoſe, who recommend public granaries, have determined what quantity of corn they thought neceſſary to be laid up in them. By the Signor Guaſtaldi's account, mentioned in No. 19, of your Second Volume, "the ſtate of Genoa had always, in their public granaries, ſeven years proviſion of corn before hand." This ſeems to be a very ample proviſion; and I ſhall, in favour of theſe granaries, ſuppoſe, that leſs than half this, or only three years proviſion, may be ſufficient for England, at a

medium

medium of the granaries being full when corn is cheap, and near empty in a dear time of the longeſt continuance. But to have this quantity always before-hand, or even leſs than this, it is neceſſary to provide ſtore-room for more than three years proviſion, to be laid up in cheap times; and alſo room to ſpare, in order to lay the corn thin at firſt; and for it to run from the upper to the lower ſtories, when ſcreened and aired. And, therefore, if we ſuppoſe, that room for only four years proviſion may be ſufficient, this will alſo be allowed as favouring the ſcheme of granaries. But after all theſe abatements, to have room for four years proviſion of wheat at firſt, or when the granaries are quite full, there muſt be four thouſand nine hundred and thirty-eight ſuch granaries, as that above deſcribed: for ſo many will be neceſſary to contain ſixteen millions of quarters.

To determine what advantage theſe granaries may be of to the public, we muſt fix ſome price for the prime coſt; and, alſo, how much it may probably ſell for. The markets are governed by the quantity produced: which, being variable, the prices will be ſo likewiſe; and the granaries cannot be always filled when wheat is cheapeſt. For, in that caſe, much more room would be neceſſary than is here ſuppoſed. But, in general, the granaries are to be filled, when wheat is under the middle price; and ſold out when above it: and, therefore, the prime coſt will be nearly the mean between the common and loweſt prices; and the ſelling price the mean between the common and higheſt. Theſe, according to Windſor market, for ſeventy-five years, ending in 1762, (admitting wheat to fall five ſhillings *per* quarter, upon diſcontinuing the bounty) are nearly twenty-ſix ſhillings and ſix-pence half-penny, and forty-four ſhillings one penny half-penny *per* quarter; and the difference between theſe, being ſeventeen ſhillings and ſeven-pence *per* quarter, is the profit accruing to the public from theſe granaries, upon ſo much as is ſold every year.

How

How much this profit would amount to every year, is uncertain, as it depends upon the quantity ſold in a year, which cannot be determined: but, if the whole quantity, lodged in theſe granaries, were to be ſold once in ſeven or eight years, the annual profit would fall very much ſhort of the expence: as will appear from the following ſtate of it, *viz.*

	£
To firſt coſt of erecting four thouſand nine hundred and thirty-eight granaries, at fifteen hundred pounds each - - - -	7,407,000
To three years proviſion of wheat, being twelve millions of quarters, at twenty-ſix ſhillings and ſix-pence half-penny *per* quarter - - - - - - - - - - -	15,925,000
To commiſſion for buying, at one ſhilling *per* quarter - - - - - - - - - -	796,250
	24,128,250
To intereſt of this ſum - - - - - - -	1,206,912
To clerks and men - - - - - - - -	987,600
To repairs, fuel, *&c.* and waſte of corn, above - - - - - - - - - - - -	305,488
	2,500,000

Thus there is above twenty-four millions ſunk, and two millions and a half a year expence. The profit upon the wheat ſold, and the bounty together, will ſcarce pay half this expence: and though it is not pretended that this eſtimate is accurate in every particular; yet, if upon the whole it is any thing near the truth, the ſcheme of public granaries will not, I think, be either expedient or practicable.

2. The next thing to be conſidered is, whether, after all this expence, corn would be cheaper; and if it were, what effect this would have upon agriculture?

It has been ſuppoſed, that, upon diſcontinuing the bounty, wheat would of courſe fall five ſhillings *per* quarter; and likewiſe that the ſame quantity would be ſtill exported. Now it is certain, that all the wheat produced in England, is either conſumed at home, or exported: and, therefore, the wheat exported is all that can be ſpared for the granaries. The quantity exported yearly, at an average of twenty-five years, ending in 1756, was three hundred and forty-five thouſand eight hundred and twenty-three quarters: ſo that, if all the wheat exported were to be lodged in theſe granaries, they would not be full in leſs than thirty-five years, even if none were to be ſold out of them, in all that time: which is a further argument, that ſuch granaries are impracticable; or, that, if they could be introduced, they would put an entire ſtop to the exportation; and, conſequently, occaſion a further and very great loſs to the nation.

It is often ſaid, in favour of theſe granaries, that they would be a ready market for the farmers, when corn was cheap. But the intention of them being to ſink the price of corn in general, it is but poor encouragement to the farmers, that they muſt always ſell at a low price. This, however, could be but temporary; for the bounty being taken away, the price ſunk, and the farmers confined to one market, corn would become an unprofitable crop to them: for which reaſon they would undoubtedly raiſe leſs corn than they do now; and then, of courſe, it would be dearer. Thoſe, who adviſe the bounty to be diſcontinued, and to erect public granaries, are ſenſible this would be the conſequence: and, therefore, propoſe, that other encouragements ſhould be given to agriculture in lieu of the bounty. But, till it is ſhewn what other can be given equal to the bounty, and a free trade, it will be ſafeſt to purſue the ſame meaſures, that have been found ſo long ſucceſsful.

3. Though

3. Though it is the practice of ſeveral countries, to lay up corn in magazines, it may not be proper to do ſo in England. In large kingdoms, where the interior parts are remote from the ſea, or navigable rivers, it may be neceſſary to ſave corn in magazines; and alſo in populous ſtates, that have a ſmall extent of territory, ſuch as Holland. As the policy of the Dutch, in this reſpect, has been greatly magnified, and their example recommended for England, it may be proper to take notice here, that their circumſtances being very different, what is neceſſary to one, may be not only improper, but very prejudicial to the other.

The province of Holland, though only about a fifth part larger than Kent, is computed to contain above two millions of people. The ſoil, in general, is of a bad quality, and improper for corn; of which it is reckoned, they do not raiſe enough for a tenth-part of the inhabitants. So that about two millions of them muſt have corn from other countries; and, therefore, they are under a neceſſity of laying up enough in magazines for their conſtant ſupply. But their magazines are not intended ſolely for the uſe of their own people; but alſo to lay up corn, when they can buy it cheap, to ſell it again wherever they can get a profit by it. So that if they did not want to buy for their own people, they would, notwithſtanding, have magazines of corn for trade; as they have for all kinds of merchandize: and, therefore, if we ought to imitate the Dutch in erecting magazines for corn, why not for all other goods, and make all our ports free?

And herein lies the miſtake of thoſe, who recommend the ſame policy for both countries, though their circumſtances are widely different. Holland is but a ſmall tract of bad land, and produces very little for manufactures, or trade. England, on the contrary, with about three times the number of people that are in Holland, contains about thirty times the quantity of much better land, in a better climate; and has a large native product, ſufficient for the inhabitants, and, alſo, for a conſiderable foreign trade.

The land and product of England, are a large part of the riches of the ſtate, and of individuals: and, therefore, in all deliberations concerning the public, they are to be conſidered; and land and trade are to be made ſubſervient to each other, ſo far as is conſiſtent with the good of the whole.

For this reaſon, public granaries cannot be for the intereſt of England, unleſs the benefit, ariſing from them to trade, were of more conſequence to the public, than the loſs occaſioned by them, in ſinking the value of land: which does not appear in the preſent caſe. But the bounty is advantageous to land, and to trade alſo, as may be ſeen from the following obſervations.

England was not conſiderable in foreign trade and ſhipping, till about 1600; nor had made great progreſs in huſbandry. For money was then at ten *per cent.* and the current price of land was twelve years purchaſe. In theſe circumſtances, no great improvements would be made: when thoſe, who had money, could make ten *per cent.* of it without that trouble. The ſhipping was, alſo, very low at that time: for, by an account taken in 1582, by order of the lord high-admiral, there were then only two hundred and ſeventeen ſhips and veſſels, above eighty tons, belonging to England: and about thirty years after this, not above three merchant-ſhips, of three hundred tons, and upwards: as we are informed by Sir Joſiah Child, in his Diſcourſe of Trade.

But, about 1660, trade had made a quick progreſs, intereſt of money was fallen to ſix *per cent.* and the value of land very much advanced; and it appears, by the table in my laſt letter, that wheat had riſen above thirteen ſhillings *per* quarter: this was the conſequence of a growing trade, for that makes every thing dearer. And hence it is evident, that to make corn cheap, a further encouragement is neceſſary, than what ariſes from trade.

Hitherto a conſiderable part of the trade of England had been carried on by foreign ſhips, and chiefly by the Dutch; and, for this reaſon, the Act of Navigation was made, to exclude

exclude the Dutch and others; and to encourage Engliſh ſhipping. At the ſame time, an act paſſed, laying a duty upon corn imported, and permitting alſo a free exportation of it; which, with the additional duties laid ſoon afterwards upon corn, and granting a bounty upon the exportation of it, laid the foundation of the improvements in huſbandry, that have been made ſince.

The trade of England is now much greater than it was in 1660: and though it has been interrupted by war, and other accidents; yet, if upon the whole, it has increaſed in the laſt hundred years, as much as it did in the former ſixty, the price of corn would have advanced in proportion, as in fact the prices of other things have done: and in that caſe, the mean price of wheat in 1662, would have been nearly ſixty-nine ſhillings *per* quarter, whereas it was really leſs than thirty-nine ſhillings: and, therefore, this difference of thirty ſhillings *per* quarter, is clear profit to the public upon wheat; and a profit in proportion, upon all the corn produced in England.—This is an important fact in the preſent argument; nor is it material whether the price of wheat is ſo much lower as is here ſtated: but it is certainly very much cheaper; and thence we may draw the following concluſions. Firſt, that public granaries are unneceſſary: for the end, that was propoſed by them, is attained by the bounty. Secondly, the bounty does not make wheat dearer to our own people, five ſhillings *per* quarter, as has been ſuppoſed: but, on the contrary, they have it, by that means, thirty ſhillings *per* quarter cheaper. And, thirdly, this points out the reaſon of the demand for our corn abroad: as we can afford to ſell it to foreigners forty *per cent.* cheaper, than we could have done, had agriculture received no other aſſiſtance, than it does from an extended commerce. All theſe ſufficiently prove the utility of the bounty.

But it is objected, that now we are got into the tract of improvement, the bounty may be diſcontinued: this might be true in a profitable trade, wherein we had no competors; which cannot be ſaid here: and it may be a ſufficient

anſwer to the objection, to ſhew the danger of ſuch an experiment in a parallel caſe. "A large bounty," *ſays Mr. Gee's Treatiſe upon Trade*, p. 212. "was given for ſeveral "years, to encourage the making of pitch and tar in "America, till it came to be imported in ſuch vaſt quan-"tities, that we had not only enough for our own con-"ſumption, but even to export to our neighbours; from "which great plenty, we were ready to perſuade our-"ſelves, that the buſineſs was effectually eſtabliſhed; and "thereupon neglected the continuance of the bounty: "ſince which, the importation of theſe commodities from "Ruſſia, Sweden, and Norway, is re-aſſumed."

Was it indeed true, what has been frequently aſſerted, in ſupport of ſome favourite ſcheme, that foreigners muſt have corn of us, a bounty would be unneceſſary, in reſpect to foreign trade. Thus, Sir Matthew Dicker, ſpeaking againſt the bounty, ſays, p. 54, "The pretence of encou-"raging tillage, by a bounty on corn, can have no weight "now, ſince our great improvements in huſbandry: much "leſs, if we erected magazines of corn in every county, "againſt times of ſcarcity. *Foreigners never buy proviſions "till they want them, and then they muſt have them, whether "we give bounties or no.*"

If this be the caſe, we have got the monopoly of corn; and may ſet our own price upon it: but, if we only fancy ſo, and ſhould act as if it were real, we ſhall fall into a dangerous error. The profit upon corn exported, is a matter of great conſideration to England, in a national view: but it is a ſtrange conceit, that we have the monopoly of it againſt all Europe, though all that we export, is ſcarce ſufficient for one-third of the people in the province of Holland.

Beſides, it is well known, that all countries produce corn, from about twenty-five or thirty, to ſixty degrees of latitude; and though we have no reaſon to complain, yet it is certain, that ſeveral other countries are more fertile than England; and that the principal reaſon, why all of them, of any conſiderable extent, do not produce corn enough

enough for the inhabitants, is a want of induſtry: which it is the intereſt of England to encourage, by ſupplying them with cheap corn.

Moſt of the countries in the Baltic, and Mediterranean, abound in corn; and, from thence, the Engliſh were ſupplied, before they raiſed enough of their own. It is quite unneceſſary to enlarge upon a thing ſo generally known: and, therefore, I ſhall only mention a circumſtance, reſpecting the fertility of Barbary, ſpoken of by the curious and learned Dr. Shaw, who lived twelve years in that country. The ſoil is ſo light, that a pair of ordinary oxen uſually plough an acre of it a day: "and one buſhel "yields ordinarily from eight to twelve, though ſome "diſtricts may perhaps yield a much greater increaſe: "for it is common to ſee one grain produce ten or fifteen "ſtalks." *Travels*, p. 137. This is a much greater increaſe, than is common in England; and with this additional advantage, in favour of that part of Africa, that the corn is in no danger of receiving damage by wet: for there is ſeldom, or never, any rain there in harveſt. But, what is ſtill more remarkable, theſe plentiful crops of corn, are conſtantly produced without any manure. "The "plains of Africa," *ſays our author*, p. 399, "are never "manured; yet the ſame fertility in the ſoil, and the like "plenty and abundance, that have been recorded of their "crops, for above theſe two thouſand years, continue to "this day."

If we look towards the Baltic, we ſhall not only find ſeveral large countries, that have been long noted for plenty of corn, but alſo ſome others, which may probably come in for a large ſhare of that trade; and very much ſink the general price of corn in Europe. For, I obſerve, in your Number 23, for the month of July laſt, that among other countries, where your *Muſeum* is circulated, Ruſſia is mentioned, where you remark, gentlemen, "that great "encouragement is given to agriculture." If this is continued with ſpirit, it may have great effects, in regard to corn, and other articles of commerce.

The

The great river Wolga takes its courſe for many hundred miles through the fertile parts of that vaſt empire: and Captain Perry, who was employed by the late Czar, in ſeveral great works, and in different parts of that country, fourteen years, did at laſt take a ſurvey of that river, in order to make a communication between it and the Nieva, that falls into the gulph of Finland, at Peterſburgh. This he found very practicable, and would have performed it, had not the ill-uſage he met with, obliged him to leave the country. The great importance of this communication, he mentions in his State of Ruſſia, p. 245. "If the Czar," ſays he, "lives to perform the communication, which it is "his intention to make, for free water carriage, between "the Wolga and Peterſburgh, he will then be able to "bring oak and timber, with plenty of corn, to that place, "at very eaſy rates: that the ſame may both pay a conſi- "derable duty to the Czar, and turn very much to the "advantage of his country, by the being exported from "thence to other parts of Europe: for corn may then be "loaded much cheaper there, than can be delivered, ei- "ther at the ports of Riga, Dantzick, or Koningſberg; "from whence, and other places in the Baltic, the Hol- "landers alone, load every year eight hundred or a thou- "ſand ſail of ſhips with corn.

"The Ruſſes make the moſt part of their bread with "rye, which they reckon to be the moſt ſtrengthening "for men: and in many places on the Wolga, between "the mouth of Shackſna and Caſan, rye is uſually ſold "for the value of an Engliſh ſix-pence, or ſeven-pence *per* "buſhel, according to Engliſh meaſure: wheat is about "nine-pence *per* buſhel; and all other grain is there in "price proportionable."

When theſe things are duly weighed, together with the improvements in huſbandry now carrying on in many neighbouring countries; there is great reaſon to expect, that the general price of corn in Europe, will be lower than it has hitherto been; and of courſe a leſs demand for it from England: which will check the progreſs of Engliſh agriculture;

agriculture; and hence the neceſſity of a public encouragement to tillage and exportation, and of introducing new methods and improvements. It is to thoſe already made, in conſequence of the bounty, that the farmers have hitherto been enabled to continue raiſing ſtill larger quantities of corn, though the prcie has been ſinking upon them for one hundred years; and though, during that time, the price of labour, and of the neceſſaries of life, have been advancing; as alſo the rent of land, taxes, and coſt of implements of huſbandry.

Though I am of opinion, that public granaries would be very prejudicial in England, I would not be underſtood to mean, that no proviſion ſhould be made againſt times of ſcarcity. On the contrary, I think this highly neceſſary: but that ſuch proviſion ſhould be in the hands of private perſons; and more eſpecially, of the growers of corn: and this for ſeveral obvious reaſons; but chiefly, becauſe the poor are thus ſupplied at firſt hand; and, therefore, in the cheapeſt manner. Likewiſe, as this is the moſt certain way, to prevent engroſſing, in every degree hurtful to the public. For, of the ſeveral cauſes, that have been aſſigned of the high price of corn, there is none, in my opinion, ſo groundleſs, as that of its being engroſſed by the farmers. That ſuch a great number of perſons, of ſmall capitals, diſperſed over the whole kingdom, who have no foreign correſpondence, and very little at home further than their own neighbourhood; that theſe perſons, ſo circumſtanced, can combine together, to raiſe or keep up the price of corn, is altogether incredible; and contrary to every idea of engroſſing.

By keeping wheat in ricks, the farmers loſe the immediate benefit of the ſtraw: and the corn is liable to be damaged, by vermin, and otherwiſe. Sometimes they have not convenient room to houſe, and threſh their wheat, when the market is riſing; and, at other times, they muſt pay an advanced price for threſhing it. Theſe inconveniencies might be avoided, if they had granaries to lodge it ſafely; and it would then be ready for market, upon

the ſhorteſt notice. The granaries, contrived by M. Duhamel, are, in my opinion, by much the cheapeſt and beſt hitherto propoſed; and very convenient for the uſe of farmers, or others, who might incline to lay up ſome corn upon ſpeculation; eſpecially if made of plank, and ſo conſtructed, that they could be eaſily taken to pieces, and carried from one place to another, where the owner might think proper to ſet them up again: and probably they might be contrived ſo as to be made larger or ſmaller occaſionally.

But, whatever methods may be thought of, to preſerve corn, in a cheaper or more compendious manner than has been commonly practiſed, they will not invalidate the objections to public granaries, as they lie againſt the whole ſcheme, for other and the ſtrongeſt reaſons, beſides the expence. And, as it is of great importance to the community, that there ſhould be corn in private hands, and in all parts of the kingdom, againſt times of ſcarcity, it is, I apprehend, a matter worthy of the conſideration of the London Society, by what means the farmers and others may be encouraged and enabled, to preſerve corn in a cheap and ſafe manner.

And, in order to promote this, by means of your *Muſeum*, it would, in my opinion, gentlemen, be very uſeful, to give an accurate drawing and deſcription of M. Duhamel's granaries, with ſuch improvements as you think proper; which would make the advantages of them generally known. And though theſe granaries, and the ventilators, *&c.* proper for drying or airing the corn to be kept, may ſeem ſtrange at firſt, to many of thoſe for whoſe uſe they are intended; yet as there is nothing of difficulty in them, more than in ſome other things daily practiſed in huſbandry, a few premiums to introduce them, and ſome examples of the utility and benefit of them, would overcome all prejudices; and they would in time come into common uſe, to the great advantage of the public.

I am, GENTLEMEN,

April 29, 1766. Your moſt humble ſervant,

E. S.

NUMBER LX.

Further Conſiderations on the national Advantage of the Bounty on Corn: In a ſecond Letter from E. S.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

THE author of the letter, No. 30, in your laſt month's publication, ſigned a Manufacturer, has made objections to ſome particulars in mine concerning the bounty in corn: and though, I think, they fall ſhort of the argument, a reply to them may ſerve as ſome further illuſtration of this ſubject.

That the exportation of corn tends, at intervals, to enhance the price, is admitted; but this has not hurt the poor, as he ſuppoſes: for the price is not now ſo high, as formerly, either in particular years, or upon a medium. In the dear year 1740, wheat was fifty ſhillings and eightpence *per* quarter at Windſor market. By examining the prices, at the ſame market, for ſixty-nine years preceding 1662, it will be ſeen, that twenty-ſeven of theſe years were as dear, and ſeveral of them much dearer than 1740. But that, in the laſt one hundred years, ending 1762, there were only eighteen of them ſo dear as 1740. Thus, in every five years of the firſt period, two of them were as dear as 1740: but in the laſt period, only two in eleven were ſuch dear years. Does not this demonſtrate, that the encouragement given to tillage, and exportation, has been a great benefit to the poor?

The tragical ſtory, related by him, to gain any credit, ought to have been ſupported by ſome better evidence than hear-ſay: the place ſhould have been mentioned; and why it happened ſo there in particular. Would he inſinuate, that the poor in general were ſtarved in 1740? Or, can he name a pariſh in England, wherein fifteen hundred poor

people died in ſo many months for want of bread? Such ſhocking ſtories have a very bad tendency; and can be invented for no other purpoſe than to inflame the minds of the poor, under a pretence of compaſſion for them.

I ſhall not charge your correſpondent with having ſuch a bad deſign: but I muſt acquaint him, that his hearſay is falſe hiſtory: and, therefore, that the conſequence he has drawn from it, falls to the ground. His mentioning a pariſh in the weſt, points to the woollen manufacture. The ſtagnation in that manufacture, was not in 1739 or 1740; nor was it in conſequence of the dearneſs of corn: but it was before either of thoſe years; and when corn was not dear.

To make this clear, I muſt obſerve, that great complaints were made of the decay of the woollen manufacture, for ſeveral years before 1740. Several pamphlets were written on that head, applications made to parliament, and various cauſes aſſigned for this decay of trade. The clothiers attributed it to the running of wool, the high wages of their workmen, and their idleneſs and debauchery. The workmen alledged, that the clothiers oppreſſed them, that they had combined together to ſink their wages, and obliged them to take goods in truck, at exorbitant prices, *&c.* And in 1738, there was a riot at Malkſham in Wiltſhire, where the goods of ſome clothiers were deſtroyed; for which three of the rioters were executed at Saliſbury.

The ſtagnation of trade was not attributed to the dearneſs of corn, either by the clothiers or workmen: nor could it be ſo with any reaſon. For wheat was but about four ſhillings and ſix-pence *per* buſhel at Windſor market in 1737 and 1738: and it was then, that the complaints run higheſt of the badneſs of trade; and that a general addreſs was made to parliament by the woollen manufacturers, complaining of "the ſinking ſtate of the woollen "exportation trade, humbly repreſented by the Britiſh "manufacturers, 1737." Wherein they ſay, "Your "honours are fully appriſed, even by your tenants, that "the

" the effects of a declining trade are now generally felt, " *and no cauſe can be aſcribed*, but the great decay of our " woollen exportation trade; and that evidently owing to " the Britiſh and Iriſh wool exported." Your correſpondent may here perceive, that, by blending together dates, and facts, which have no connection, he has given a very partial account of this matter.

He ſays, a dear year cauſes a ſtagnation of trade: others ſay the contrary. For this, I ſhall refer him, to a pamphlet, entitled, " *The caſe between the clothiers and weavers*, " 1739," written by a *manufacturer*; who brings ſundry arguments to prove, " that low wages, or high proviſions, " promote trade: and are alſo beneficial to the workmen." One paſſage will be ſufficient for a ſample. " The beſt " goods, ſays he, " are made in the worſt times: when " employment is ſcarce, every manufacturer endeavours " after perfection in his particular branch, for fear of be- " ing diſmiſſed. In dearneſs of proviſions it is juſt the " ſame. If wheat ſells for ten or twelve ſhillings *per* " buſhel, the manufacturers are obliged to work more, " and debauch leſs."—It ſeems, that this argument about trade, proves againſt the farmers, that proviſions ought to be cheap; and againſt the workmen, that they ought to be dear.

In 1739 or 1740, he ſays wheat ſold for ten ſhillings; and in 1742 or 1743, for two ſhillings and ſix-pence *per* buſhel: " and hence," he adds, " appears the abſurdity " of an immoderate price. For, in this manner, it will " ever tend to ſink itſelf, and avarice be juſtly rewarded." By this, we are to underſtand, that the farmers are engroſſers of corn; and that they had an immoderate profit upon it in 1740. But, if they got ſo much by it then, they were, no doubt, the better able to engroſs it afterwards: and he will not doubt their inclination. Why then did they not engroſs it the laſt of theſe years, as well as in the firſt? For if we ſuppoſe that the crop in 1742, was four times as great as in 1740, this will not remove the difficulty. They could as well have engroſſed four

buſhels

buſhels at two ſhillings and ſix-pence, as they could one at ten ſhillings. Hence, therefore, appears the abſurdity, not of the immoderate price in 1740; but of the notion, that it is in the power of the farmers to engroſs corn.

Your correſpondent has hit upon a convenient method of taking an average, by throwing out the dear years, becauſe they did not ſuit his argument. Probably the farmers, as parties concerned, and who, he acknowledges, never paid higher rents than now, may think they ought to have the ſame liberty, of throwing out the cheap years; and then we ſhall be juſt where we were. But he muſt allow me, to tell him, that the conſequences reſulting from a juſt compariſon of the prices of corn, before and ſince the bounty, are of too great importance to the public, to be thus trifled with. It is from thence evident, that corn has been much cheaper than before; and this not by any oppreſſive meaſures, and ſacrificing the intereſts of one part of the community to thoſe of the other, but by encouraging a general improvement, to the advantage of all. This, it might be imagined, would meet with a general approbation: and, doubtleſs, it will, by all who impartially conſider it.

My letter does not ſay, that the exports of corn were but one million two hundred thouſand pounds in ten years: but that they were ſo much *upon an average* of ten years; and page 20, that ſo much was gained *every year* to the nation. Nor does he take any notice of the freight; or that the corn exported employs one hundred and fifty thouſand ton of ſhipping.

What I ſaid of all other things advancing in price, except corn, was meant of all things, that denote the dearneſs of living; and for that reaſon I inſtanced the price of labour, which is one of the moſt certain rules of judging the rate of living in every country: ſeveral others being more or leſs indeterminate. The prices of many manufactures are variable, depending upon the dexterity of workmen, their quality, the faſhion, and the demand for them at home or abroad. But as corn is undoubtedly

cheaper than formerly; and bread being a large article of conſumption in a poor man's family; if "every ſpecies "and kind of manufactures are alſo cheaper," whence is it, that labour is dearer? Do not the manufacturers and farmers pay more for labour than they did one hundred years ago? I am afraid, therefore, theſe cheap manufactures are chiefly for luxury: and that the poor are not much benefited by their cheapneſs; though they are greatly ſo by the cheapneſs of corn.

I ſhall paſs over your correſpondent's indecent reflection, for which there is not the leaſt foundation in my letter. It would be eaſy to retort, where there is ſo much room given; but I forbear, in regard to your work, which I wiſh always to ſee filled with more uſeful matter.

I am, GENTLEMEN,

May 12, 1766. Your very humble ſervant,

E. S.

NUMBER LXI.

A further Account of the Uſes and Advantages of the double Plough; particularly in the Cultivation of Horſe-Beans: In a Letter from Mr. Randall.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

IN my letter *, *Number* 34 *of your Muſeum for laſt April*, I informed you, of the conſtruction of, and mode of culture by, the double plough, there recommended: but as what I then ſaid was only a ſmall part of the ſyſtem of experi-

* We are extremely obliged to Mr. Randall for this communication; as well as for his former letter on the ſame ſubject: and we are much pleaſed to find, that the account of the double plough, which of itſelf was very ſpecious and ingenious, is authenticated by the name of a gentleman, whoſe great experience, and adherence, to juſt and rational principles of theory, cannot fail to recommend and promote the more general uſe of it. E. O.

ments

ments I had made with it—I ſhall, as my time will give me leave, and I hope it will every month, ſend you the courſes of farming, in which that inſtrument is greatly concerned. The important objects, I ever had in view, were the deſtruction of the weeds; the deepening and refining the ſoil according to the garden culture; and the preparing it to ſow wheat, barley, and oats, in the broad-caſt mode of delivering the reſpective ſeeds. I told you, that plough would work very well in all ſoils, which are not of the ſtiffeſt nature: but, if a farmer is poſſeſſed of the ſpiky roller, mentioned in your laſt Muſeum, Number 53, it is inconceivable what ſatisfaction * he will have in the uſe of the

* This plough, and the ſpiky roller, will certainly, in many caſes, afford a mutual aid to each other, in the expediting a good tilth, where obdurateneſs of ſoil, and unfavourableneſs of weather, deny that conſequence to the common methods of practice. That, expoſure of ſoil to the air, is neceſſary to that mode of fertilization, called fallowing, is allowed by all: that, repeated ſtirring of the ground, is eſſential to this expoſure, is ſelf-evident: and that, ſuch ſtirring cannot have its due effect, where the ground is only turned up in large clots, is equally certain. A plough, therefore, which ſhall have the effects of two ſtirrings at one going over the ground: and a roller that will always remove the impediment to this operation, which ariſes from the clotting of clayed land in dry ſeaſons, cannot but afford both a facility and certainty of reducing the ſoil to a moſt improved ſtate. It were much to be wiſhed, that this method ſhould be adopted, at leaſt experimentally, in many different parts of the country, by gentlemen who are promoters of improvements in agriculture. For the principle, being fertilization by mechanical aid, renders the conſequences of the advantage, gained by the method, much more intereſting to the public, as we have formerly obſerved, than any method founded on the uſe of manures or compoſt. Dung is limited in quantity in all places: and lime, marl, peat-aſhes, &c. are confined to particular parts. But the uſe of machines, of ſimple conſtruction, cheaply purchaſed, and eaſily uſed, has no reſtrictions: and where they are introduced into general practice, and afford greater crops, the conſequence to the public is the ſame as if the ſoil itſelf had been proportionably improved. In this light, the mechanical improvements claim the greateſt attention from the public, eſpecially at this time, when proviſions are grown extremely dear, from cauſes, that, in all probability, will ſtill increaſe in their influence; and can only be counteracted by adequate improvements in agriculture. E. O.

double

double plough, let his ground be never ſo ſtiff. And here I muſt beg leave to obſerve, that the expence of the ſpiky roller, will, to my own knowledge, be ſoon repaid by the ſavings in clotting, were this its only uſe. Let us now ſuppoſe the ſtiffeſt ſoil thrown up to be fallowed, and ploughed once over before winter with the farmer's own plough; and then immediately thrown up in ridges with the double plough. Great care muſt be taken, during the dry part of the winter, to bout theſe ridges off; by which means the ground will have had three ſtirrings: one with the common plough; and two with the double plough. On the firſt opportunity in the ſpring, when the ground is fit to bear the horſes tread, level it with heavy harrows: but if the ſoil be quite dry, let the ſpiky roller be drawn twice in a place the long way of the ridges, before the harrows are uſed; which they may be, with yet more effect, if the ground will admit them to be drawn acroſs the ridges. In either form of harrowing, let the roller again go twice in a place. Now take the double plough; and draw out a furrow about three inches deep: and let the ſeedſman throw in horſe-beans, following the plough-man to the head-land: where, let him gueſs his ground in coming down again, ſo as there may be full three feet of ſpace from the edge of the firſt furrow, to the near edge of that he is now going to make: which the ſeedſman is to ſupply, alſo, with the ſeed-beans. And ſo on through-out the field. By this it will neceſſarily come to paſs, that the ground will, in appearance, be only one part in three ſupplied with ſeed; which one part, the farmer may cover, by turning a light furrow on it, with his common plough; and level the earth over the ſeed, by letting the ſpiky roller, drawn by a team of three horſes, one before another, once in every other three-feet ſpace, which is un-ſown. By this means the roller, being ſeven feet in length, will, with its ends, over-reach the two ſown furrows, one on the right, and the other on the left-ſide of the horſes; and, conſequently, there will be great diſpatch in this operation of levelling the mould over the ſeed.

And now the worthy farmer will conceive, that his ſurly clay ſoil is well prepared for the reception of his horſe-beans. I hope his good ſenſe will deteſt, the nonſenſe, of an opinion, that beſtowing a little more labour on his ground for the growth of this vegetable, is throwing his money away. Let him aſk any gardener; and he will tell him, the better he prepares the ground, the larger will his crop be: or, if he attend to the practice of gardeners in growing Windſor-beans, he will be ſoon cured of that unprofitable cuſtom of ſowing horſe-beans on a rough tilth. Wherefore if common ſenſe, and not tradition, take place, he will give his ſeed the beſt chance of being nouriſhed to its deſtined maturity; which is its natural bias; but requires a finer tilth, or preparation of the ſoil: as then the ſhoots beneath the ſurface can eaſily extend, and diſperſe themſelves, in queſt of nouriſhment, to be conveyed up to the plants above ground. On the contrary, let the ſoil be very clotty, and the conſequence will be, that theſe ſhoots cannot penetrate the hard lumps, any more than they can pierce through ſtone-walls, to extract the vegetable principles, neceſſary in the growth of plants. To depend, while the beans are growing, upon the rains waſhing or mouldering away theſe hard clots, is, what a ſenſible farmer will wonder at, when he diſcontinues the cuſtom of thus injuring his crop, himſelf, and the public. But ſuppoſe the rain ſhould thus befriend him, he knows what a ſad ſituation his beans are in, when there comes a parching ſpring and ſcorching ſummer. Let him then view a fine tilth, and a rough one. The firſt keeps the beans in motion; and makes them look in perfect health: becauſe they do not want nouriſhment, as the dews ſink into the looſened ſoil. But the other diſcovers great diſtreſs: as they receive no ſuccour from the atmoſphere, unleſs the dews could penetrate ſuch ſurly clots; which is utterly impoſſible.

We ſhall now ſuppoſe, the beans have made their appearance above ground; and plenty of weeds with them. Let the beds of beans be now weeded; and, the pro-

portion of ſuch weeding will be, the third part of an acre. The weeds are come up again.—Weed a ſecond time.—They are come up a third time.—Deſtroy them again: and then you will have weeded one acre; with this difference, that the people ſtand in the unſown ſpaces; and, therefore, can do no harm to what is growing. But, in the common way of weeding, no body will undertake to ſay, that there is no injury done to the vegetable crop: or that the ground is not made worſe: as the people's tread makes that cloſer, which was too cloſe together before. We have now done weeding the beans.—The ſpaces are next to be taken care of.—Turn a furrow from the beans, with your common plough; and go the uſual depth: but go as near the plants with the ſhare point as you can, without damage to them. The conſequence of thus turning a furrow will be, that, as the ſpace was three feet wide, you will leave a ridge in the middle; and the ground beneath will not now be ſtirred. If you find it neceſſary, that is, if the weeds in the ſpaces are making a formidable appearance, you may perform this operation of throwing up this ridge, any time before the laſt weeding the beans. It is no more, than juſt to make theſe weeds turn to your advantage, for all the great miſchief they may have done you. To your profit they will thus moſt certainly turn: as there are the ſame chemical principles in them, proper for the growth of plants, as are found in dung; but, in a leſs proportion: and, therefore, the weeds being now buried under the ridge, they will bring on a fermentation; and enrich and refine the ſoil within their reach. When you think, the weeds under the ridges are putrified, take the double plough, and ſplit the ridges; and, in ſo doing, you will earth up the beans: but take care you do not overthrow the mould, by raiſing one hand higher than the other. Keep but the ſole of the plough level in the ground; and you may go the uſual depth. And now the mould in the ſpaces is properly expoſed, to receive the influence of the atmoſphere. Let the weather happen, as it may, you will be in the way, to meet a gracious Providence, according

to his own appointment: who has laid up his treaſures for us in the atmoſphere, if we have but the ſenſe to make preparation for their reception. If the weather be a continued rainy ſeaſon, the beans, in their preſent ſituation, will be wonderfully puſhed on to maturity. If it be a ſcorching ſummer, the looſe mould will imbibe the dews; and give vigour to all the plants within their reach. But, if, in a very wet ſummer, the weeds ſhould again appear in the ſpaces, run the double plough up and down them: and, letting the ſhare have a little earth, you will by this means ſmother your enemies: which can do you no more harm after this operation. Now, as this ſtiff ſoil, when well prepared, is four times as rich as the lighter lands, you may, from what has been done, expect a fine crop of beans: notwithſtanding the ground may appear, in the moſt flouriſhing ſtate, of the beans, at their full growth, to be only half covered over.

I am, GENTLEMEN,

York, Your obedient ſervant,

June 17, 1766. J. RANDALL.

[*To be continued.*]

P. S. If the editors are pleaſed to inſert this in their next *Muſeum*, I ſhall ſend you another letter *: and ſo on, whenever I ſend you any thing. Becauſe, as I keep no copies of my letters, I cannot go on, without ſeeing the laſt I ſend you every month.

* The editors will be very much obliged to Mr. Randall for his future correſpondence, according to the manner of his kind offer; and though they will not have the opportunity of inſerting the pieces monthly, they will give them a place in the periodical volumes they intend to publiſh. The firſt of which will be in January. If Mr. Randall will, therefore, favour them from time to time, the printed copy of each reſpective piece ſhall be ſent to him as ſoon as worked off: and then there will be no difference, but that the public will have more of his ſyſtem laid before them together, which may perhaps be rather a convenience than a diſadvantage; as one part will, in all probability, tend to illuſtrate the other. R. E.

NUMBER LXII.

Obſervations on the proper Manner of cultivating Flax, for the making very fine Thread; *on the making Cloth of* Hop Binds *and* Nettle Stalks; *and on the applying the fibrous Part of the Stem of the* Plantain, *to the making Cordage, Fuſtians, Lawns, Knitting Work, Gauze, and Candlewicks: In a Letter from* Agricola.

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

ON ſeeing your advertiſement, at the end of your laſt Number, declaring your intention to diſcontinue the Monthly Publication of your *Muſeum*; and for the future to give periodical volumes, containing ſuch matter as may be collected in the intervening months, and beginning next January; I was induced to write an additional letter to that, which, I had before ſent you on the boorcole, concerning ſome other articles: which tho' they do not require a long diſcuſſion, are yet of ſome importance in their nature.

The improvement of manufactures, which depend on very fine thread, are of great conſequence to this country; becauſe they employ women and children: and are carried on, therefore, by means, that do not take off the ſtrong and able hands, who ought to be employed in our preſent ſtaple manufactures; or in agriculture. The general political advantages, as well commercial as moral, of profitable means of employing ſuch hands, I have before pointed out in my letters on the production of ſilk in England, inſerted in your laſt February number. With reſpect to thoſe manufactures, particularly, in which fine thread is uſed, we are happily in poſſeſſion of ſome at preſent; there being now very conſiderable quantities of lace, as well imitations of the fine Mecklin and Bruſſels kinds, as minionet,

minionet, made in ſome parts of Great Britain; to the ſaving of many thouſand pounds a year, which would be otherwiſe paid to foreigners for that article: and we have the further ſatisfaction of ſeeing this manufacture ſtill increaſing. But while we are thus uſing great quantities of thread in this way, we are obliged to have the fineſt kinds wholly from foreigners; and when we employ our own, in caſes where great fineneſs is not required, we ſink a conſiderable part of the value of labour, by producing what muſt ſell at an inferior price than the foreign, on account of its want of equal ſtrength; owing to the inferior quality in that point of the flax of which the thread is made. This is certainly a great diſadvantage to the public; becauſe we not only pay very great ſums for the fineſt part of the thread uſed for lace to foreigners; and beſides the loſs of ſo much in ballance againſt us, inhance, by this means, the price of the manufactured articles to the impediment of the ſale: but, by the uſe of our own for leſs fine lace, check, likewiſe, the increaſe of the demand, by its inferiority in the moſt important of all qualities, ſtrength and durability. If theſe diſadvantages were irremediable, from any natural or political reaſon of ſoil, climate, want of hands, *&c.* we muſt certainly ſubmit to it. But there is no ſuch obſtacle; for flax, proper for the fineſt thread, may be produced here, as well as any where: and there is nothing in the art of ſpinning, that would not be ſoon attained by our people in perfection, were they induced to apply it: as ſpecimens have proved. Moreover, inſtead of a want of ſuch hands, as are moſt fit to be employed in this work, there is unhappily much too great a redundance of ſuch of them, as are now wholly idle.

One principal impediment, however, to the producing very fine thread, or moderately fine of due ſtrength, in our country, has been, as was intimated above, the defect of proper flax: and the removing that, is the firſt neceſſary ſtep towards the acquiſition of the whole. This is, in its nature, a very practicable matter: as it ariſes from nothing, but an ignorance or neglect of uſing the due means. For

flax, ſuch as is raiſed for the very fineſt thread in Flanders, may be any where produced by art in the cultivation: and there are places in Great Britain, where, from natural accidents, without the exerciſe of that art, ſuch flax, as will come near that kind, may be produced even by common means of culture: as I ſhall more particularly ſhow below. The artificial means of producing flax, in the way perſued in Flanders, have been put in practice here, for the uſe of the cambrick manufacture lately carried on. Had that manufacture been permanently eſtabliſhed, and there was reaſon, to hope, that the knowledge of this art would have been thence propagated, and the method applied more generally to the raiſing flax in the ſame manner for other purpoſes. But the diſcontinuance, as I am informed, or at leaſt the very languiſhing ſtate, of that undertaking, has removed the ground of theſe hopes: and is likely to leave us as deſtitute of thoſe means, as we were before. This has induced me to be deſirous to communicate more generally, the method of executing this improvement; and to record it in your collection: that, if no preſent uſe ſhall be made of it, thoſe who may hereafter engage in undertakings, where fine thread is neceſſary, may have the encouragement and aid of it.

The manner of producing fine flax, by a peculiar method of cultivation, is ſimple: and ſo are the principles on which the difference of the production of this, or coarſer kinds depend. In order, however, to render the comprehenſion of the manner more eaſy, I will firſt explain thoſe principles.

The difference betwixt the coarſer, and finer kind of manufactured flax, obviouſly conſiſts in this, that the fibres of the fine are naturally leſs thick, and groſs; and likewiſe of a leſs ligneous or woody conſiſtence: whence being leſs hard, and rigid, they are not ſo ſoon ſnapt, or broken by violence in the wear; and the thread compoſed of them is, conſequently, more durable. This flexibility and toughneſs, which is the reſult of their being leſs woody and ſtiff, contributes, as well as the ſmallneſs of

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the fibres, to that ſuperiority, which is found in the foreign fine flax. This difference in the fineneſs and conſiſtence of the fibres, might be naturally ſuppoſed to ariſe from the ſeminal difference in the kind of flax itſelf: as there are ſeveral ſpecies of flax, as well as of many other plants; and conſequently ſuch a difference might well be. But this does, nevertheleſs, not happen to be the caſe; for the fine manufactured flax is really the product of ſuch crude flax, as is raiſed from the common ſeed. The difference is, therefore, owing to ſome variation in the method of culture; or to the accidents of ſoil and air, in the place of cultivation, as the facts themſelves evince. Whatever will check and retard the growth of flax, and prevent its being vigorous and ſtrong, will prevent the fibres from becoming large and woody: and this may either be, the natural poverty of the ground, and chilline ſs of the air; or the raiſing ſuch a multiplicity of plants together, as the ground cannot ſupport, ſo as to bring them to their full ſtrength and ripeneſs: in conſequence of which, the plant is more replete with a watery ſucculence, and leſs with the mature gummous or reſinous juice; which renders the fibres woody. On this foundation, the art of producing fine flax is formed: and the particular means, by which the end is effected, is as follows.

The ground is prepared, as in other caſes; but only a number of ſtakes, of the height of a foot and a half, or two feet, with forked or branching parts at their tops, are driven into the ground: the more forked or branching parts the ſtakes have, the better they will anſwer the purpoſe. The ſeed is then ſown in the uſual way, but in a much greater proportion: even three or four times the common quantity has been uſed. Over the ſtakes, are then laid buſhes of an open figure, that bear upon the forked parts of the ſtakes; and ſpread over the whole ground. The flax, of courſe, from the great quantity ſown, comes up extremely thick: and, riſing among the buſhes, is ſupported there; and grows up among them, till it be of due maturity: when it is got off the ground as other flax, and freed from the buſhes. It is then rotted,

and

and dreſt, as other flax; except, that being very tender and ſucculent, much leſs time and more caution is required to avoid the rotting of the fibre, as well as the pulp of the herb: and that a gentler management is to be obſerved in the breaking.

The reaſon of this treatment of the flax, in its cultivation, may be eaſily deduced from the above principles. The ſowing ſo thickly is to make it riſe in a greater quantity than the ground can maintain in full vigour; and, conſequently, to occaſion it to grow weakly, and run up ſmall: by which means, it is kept from the hard and woody ſtate. The uſe of the ſtakes is to ſupport the buſhes; and the uſe of the buſhes, to ſupport the flax, and keep it from being laid on the ground, as it otherwiſe would be, being ſo weak and ſmall, by the wind and rain; and conſequently to ſave it from being rotted before it be ripe.

This is the method; and very effectually it anſwers the purpoſe. As I have ſeen, in the actual compariſon of flax, raiſed by this method, and the common, in the ſame neighbourhood: ſome ſpecimens of which, Mr. Norton, the conductor of the Engliſh cambrick manufacture, produced to a committee of the London Society for promoting arts, in the natural ſtate, as pluckt from the ground; in that of manufactured flax; and in that of ſpun yarn, and thread.

What is here directed to be done by art in general, is performed by nature in particular places. For laſt winter, Miſs Leſlie, who, with her ſiſters, have ſome years been attempting the eſtabliſhment of a manufacture of fine thread in Scotland, laid before the London Society ſome ſpecimens of yarn and thread ſpun from flax, produced in the neighbourhood of Hamilton; which flax appeared to be capable of making exceeding fine thread, of as ſtrong a texture as the beſt brought from Flanders. In the raiſing this flax, nature, through the peculiar circumſtances of ſoil, and air, did the offices of art: the poverty of the ground, and the coldneſs of the atmoſphere, bringing up the flax ſmall and weak, without any other deviation from

the common method of culture, than the ſowing the ſeed ſomewhat thicker than is uſually done. There are, doubtleſs, many other parts of Great Britain, in mountainous barren cold places, ſuch as Wales, Derbyſhire, Northumberland, &c. where ground, that at preſent affords none, or very little advantage, would yield crops of this very valuable ſpecies of flax: which would, alſo, employ the half-ſtarved male inhabitants of ſuch parts, in breaking and dreſſing; and the female, in ſpinning it: by this means, the preſent manufactures would be aided, and freſh ones eſtabliſhed, to the great advantage of the public, as well in the ſaving money now paid to foreigners for thread, in its ſimple ſtate, or fabricated into lace, lawns, &c. as in the increaſing the number of induſtrious honeſt inhabitants.

From the endeavouring to eſtabliſh the production of flax, for the fineſt kind of thread, give me leave, now, to make a tranſition into the other extreme; and revive ſome deſigns to provide a coarſe, and very cheap kind of product of the ſame general nature, that would tend to the emolument of the public, by employing ſome of the idle hands at home; preventing the importation of foreign hemp and flax; and furniſhing cheap and ſtrong cloathing for the poor. This is, by the dreſſing, in the manner of hemp or flax, the ſtalks of ſome herbs, which are cultivated in great quantities for other purpoſes, or grow ſpontaneouſly; and ſubſtituting them in the place of hemp and flax, for the making coarſe cloth, of the nature of linen.

The moſt promiſing of the kinds, which are cultivated for other purpoſes, is, the *hop binds*: which, by proper management, afford a very good and ſtrong kind of coarſe cloth, like linen. In Sweden, and Denmark, there are actual manufactures of ſuch cloth; which are profitable to the peaſants, who carry them on. The London Society, for promoting arts, from a conviction of the truth of this fact, and in conſequence of a memoir in the acts of one of the foreign ſocieties, diſplaying a general account of the making this cloth, offered premiums for the introduc-

tion of it here: but the particular treatment of the hop-binds, previous to the ſpinning, not being known, nor perhaps any attempt made by perſons, who were well verſed in the general knowledge of theſe matters, no candidates preſented themſelves; and the Society diſcontinued the advertiſement.

There is no doubt, however, but this difficulty of bringing the hop-binds to a proper ſtate for ſpinning, would be ſoon removed by trials, undertaken by thoſe, who are well acquainted with the management of flax and hemp: for, certainly, a failure can only happen, from miſtaking the proper time of rotting, which by a few experiments would eaſily be aſcertained, if conſtant eſſays were made of any quantity taken out from the water, at ſucceſſive periods, and examined by thoſe who underſtand well the method of breaking hemp and flax. Conſidering the quantity of hop-binds, produced together in ſome counties; and that at preſent they are of no other value, than any other dead weeds; certainly were they applied to this purpoſe, they would yield a very proper employment, in dreſſing and manufacturing them in winter, for thoſe, who are engaged in the cultivating, and gathering them in the other parts of the year. Another herb, among thoſe, that grow ſpontaneouſly, and may be uſed for ſuch purpoſes, in the place even of very good flax, is the common, and other *nettles*. If the ſtalks of them be well managed, they may be manufactured into a very fine and ſtrong thread: and there is a lady well known for her ingenious literary performances, who carried this art to great perfection in Ireland; and produced ſome very extraordinary ſamples of manufactured articles.

If the common people were well informed of the methods of managing any materials, which they could obtain without expence, and of rendering them certain return of profit by their labour only, there are, no doubt, among thoſe, who at ſome times of the year are greatly diſtreſt, and yet can find no work if they would do it, many, that would be very glad to turn their hands to ſuch

manufactures; and their ſucceſs would as certainly lead others to the ſame attempts.

So much at preſent for the production of materials in our own country, for the improvement of thread, lace, *&c.* Next to the obtaining them at home, to the excluſion of the foreign, we ſhould have regard to our colonies. Among the various diſcoveries and inventions, relative to ſuch matters, which might be of ſervice to both the colonies and ourſelves, if duly proſecuted, there have been none more ſpecious and promiſing, than the application of the fibrous coats of *the ſtem of the plantain:* of which ſpecimens of various manufactured articles were produced to the London Society about four years ago. Theſe ſpecimens appeared ſo perfect, according to their reſpective nature, that the Society was induced, without the leaſt heſitation, to offer premiums for the introduction of the ſeveral manufactures of ſuch articles here: and to the advertiſement of theſe premiums, they prefixed the following preamble.

"Whereas the *ſtem* of the Aſiatic and American *fruit*, "*bearing plantain*, affords three ſorts of fibrous materi- "als; which reſemble hemp, hard ſilk, and cotton: all "which have been experimentally found capable of being "wrought into various ſorts of manufactures; and, "among others, into cordage, fuſtians, lawn, knitting, "gauze, blond lace, and excellent candlewicks; ſundry "ſpecimens of which manufactures, may be ſeen in the "hands of the regiſter of the Society, *&c.*"

When the advertiſements for theſe premiums were reſolved on, a gentleman, who had ſome concern in the Weſt Indies, propoſed to have procured a conſiderable quantity of the plantain ſtems; in order, that the Society ſhould have diſtributed it, among thoſe manufacturers who might have been willing to make trials of it. But this not being executed, the difficulty of procuring them has, in all probability, been the occaſion of a total neglect of any attempts in this matter: and no candidates offering, the Society has ſince diſcontinued the premiums.

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As this is no where regiſtered, but in the Societies books, being given up before youinſerted their premiums, and articles ſo far back are not likely to be ſeen there, but by very few, I am extremely deſirous, it ſhould be preſerved in memory by your collection: where it may incite ſome public-ſpirited perſon of fortune, or ingenious artiſan, to make ſome effectual attempt for the eſtabliſhment of a manufacture of theſe materials: which could not but be productive of national advantage, as well to the colonies as ourſelves, if they could be introduced into uſe.

The diminiſhing the importation of foreign hemp, ſilk, and cotton, or of any of them, would be a public benefit, for reaſons, which we have before touched upon; and which are, indeed, obvious enough of themſelves: and there are very great quantities of the plantain continually cut down in our Weſt Indian colonies, of which the ſtems, that are very large, are now thrown away, as uſeleſs matter.

The cheap rate at which they might, therefore, be obtained here, at leaſt in a prepared ſtate, where a great part of the freight of the raw material would be ſaved; and the beauty and ſtrength of the gauze, blond lace, &c. even in the above-mentioned ſamples, which were made only in the way of experiment; give the greateſt reaſon to believe, that a manufacture of them might be profitably eſtabliſhed here, and employ part of our idle women and children.

But never, among the common people, by their own means, can ſuch matters as any of thoſe I have above explained, be originally introduced. It muſt be, by the encouragement and aſſiſtance of perſons of fortune, and more general knowledge; that new arts muſt be tranſplanted into any neighbourhood, and for ſome time duly protected and nouriſhed. There is, in our own country, at preſent, the greateſt and moſt active ſpirit of charity in making, proviſion for the indigent and diſeaſed poor: but how much more effective is the preventive relief of providing conſtant work, and diffuſing the diſpoſition to induſtry, which

which eradicates the cauſe of poverty; while the temporary palliation of ſupplying ſcantily the preſent wants, does but in fact diffuſe the evil? In a nation, where at preſent humanity inſpires the motives, and good ſenſe directs the manner, we may ſurely hope, in a ſhort time, to ſee an attention, in perſons of condition, to add to the proſperity of their country, and the happineſs of their neighbours, by ſuch attempts. The Socities, in particular counties, or neighbourhoods, of which, beſides thoſe I formerly named, another is now forming in one of the moſt rich and populous parts of England, will have a great opportunity of, and certainly proportionable effect in, promoting this view: to which alſo I hope your publication, in the new mode you have reſolved on, may, by their means, be made greatly ſubſervient. I ſhall, on all occaſions, be ready to contribute my mite, and will readily acquieſce in ſuch changes, as you ſhall find moſt commodious, in the manner of laying what I may communicate to you before the public.

I am, GENTLEMEN,

Your humble ſervant,

AGRICOLA.

NUMBER LXIII.

An Account of the inſtantaneous Improvement of Land, by turning up the Soil from two Feet depth, with the Aid of two different Kinds of Ploughs: And of the Structure, Manner of Uſe, and Expence of the reſpective Ploughs: In a Letter from Mr. Randall *to the Editors.*

To the Editors of the MUSEUM RUSTICUM.

GENTLEMEN,

I Shall take it as a favour, that you will be pleaſed to inſert what follows, as ſoon as you receive it: becauſe there will be the more time between this, and wheat-ſeed time at Michaelmas, for gentlemen to determine what to do,

do, with reſpect to the propoſed improvement: otherwiſe nothing can be carried into execution, relative to it, till that time twelvemonth.

As there is frequently an excellent ſoil beneath the reach of common ploughing, which, if it could be brought upon the ſurface, would produce vigorous and plentiful crops, without the aſſiſtance of dung; I here beg leave to acquaint gentlemen, who delight in improvements, that they may be ſupplied with a ſet of ploughs, for turning up the ſoil, in an adequate manner, and with directions to the ploughmen how to uſe them; at the following prices.

For one Foot depth.

	l.	*s.*	*d.*
1. *A looſening plough*, that goes one foot deep, without either mould or land boards: but only a broad wheel, (under the beam) and its proper ſhare, coulters, *&c.* ſo as to cut the ground eighteen inches wide; leaving the ſoil in its place, but looſened and prepared for the ſecond plough - - - - - - - - - - - -	15	15	0
2. *A lifting plough*, (with a broad wheel under the beam) to gather up the ſoil ſo looſened; and make a clear trench, eighteen inches wide, and one foot deep - - - - - - - - -			

For two Feet depth.

All things to be performed with the two laſt ploughs, to the depth of one foot, and breadth of eighteen inches: then the firſt plough is again to looſen the ſoil one foot deeper; and afterwards,

3. *Another lifting plough*, with a broad wheel under the beam, gathers up the ſoil; and throws it upon what the ſecond plough had raiſed up before - - - - - - - - - - - -	10	10	0
The whole expence in ploughs, for two feet depth, is - - - - - - - - - - - -	26	5	0

Now,

Now, it is eaſily conceived, that, when the upper *ſtratum* is tired and foul, the owner may, inſtead of fallowing the ground, turn down the worn-out ſoil, and perpetually enjoy a freſh *ſtratum*, as the weeds in general, by being buried ſo low down, will ferment, putrefy, and turn to tillage. From hence a judicious perſon will infer, that the expence of theſe ploughs may be ſoon more than repaid, in the advantage of an unexpected crop without dung.

Thoſe, who can get theſe ploughs againſt next wheat-ſeed time, may depend upon an excellent crop of wheat, if they have the opportunity which happened to me, particularly on ſixteen acres, that produced at the rate of forty-eight buſhels an acre, without dung. The ground, which was good, but very foul and run out, fell the harveſt before into my hands: ſo that I loſt no time, but ſowed the wheat-ſeed the Michaelmas after.

The reader will infer, that if all the deep and good land in the kingdom, was turned up after harveſt; and ſown with wheat ſeed, inſtead of being fallowed, great would be the conſequence to the public. There need only the two firſt ploughs for this operation; the third not being wanted till the freſh ſoil has run its courſes of crops: which muſt begin with wheat, as I doubt whether any other grain will ſo well take the lead.

Leſt any ploughman ſhould throw difficulties in his maſter's way, it may be obſerved, that after the firſt plough has looſened the ſoil, the ſecond always has the ground looſened, with an open furrow to the right; and, conſequently, this management of the land differs in nothing from common ploughing; but only in requiring a ſtronger team, without any more trouble to the holders: as the broad wheels only need, that the men ſhould keep the ploughs level, and thereby cut the ground like good ploughmen.

And, in order to promote agriculture, I further beg leave to acquaint your readers, that among other genteel parts of education, I do, and will continue, to inſtruct young gentlemen (deſigned to lead a country life, or to have

have the management of land) in the mechanical and geometrical principles of all the implements of husbandry, I have constructed; and which are now in use in many parts of the kingdom: as also of the common ploughs of different counties, &c. And I heartily wish, for the happiness of all our worthy farmers, that such a place of instruction was established in every county of the kingdom.

I am, GENTLEMEN,

York. Your obedient servant,

J. RANDALL.

NUMBER LXIV.

Description of the biennial, and perennial Weeds, enumerated in Vol. V. p. 305, &c. *In a third Letter from* P. B. C. *on that Subject.*

To the Editors of the MUSEUM RUSTICUM.

VIPER's *Bugloss.* The stalks are rough, round, solid, erect, undivided, and marked with black spots; the leaves are very rough, long, narrowing to a point, and placed without any certain order. The large specious flowers, of a beautiful blue colour, grow in long bending spikes. They consist of one petal, divided into five roundish segments, of different size; and resemble a horn in their figure; expanding by degrees, from a narrow beginning. The flower-cup consists of five narrow segments; and contains four rough seeds.

Melilot is well known by its trefoil leaves, which are indented; and, as it were, eaten about the edges: and by its long, thin spikes of small, yellow flowers; which are succeeded by short rough pods: containing two seeds.

Wild Carrot, *Bird's-nest*, or *Bees-nest.* Is very like the cultivated Carrot: of which it is indeed supposed to be only a variety. The wild sort, however, differs in its roots, being small, and sticky. In both sorts, after they

have done flowering, the umbels contract themſelves, into the ſhape of a bird's neſt.

Cow Parſnep, *Wild Parſnep*, *Meadow Parſnep*, or *Madnep*. This grows three feet high. The ſtalk is round, furrowed, and hollow. The leaves proceed from a large membrane, or ſheath. They grow on long hairy ſtalks, and are divided and downy. The flowers grow in large umbels, are white; and conſiſt of five irregular petals. Two oval, ſtreaked, compreſſed ſeeds, ſurrounded by a wing, ſucceed each flower.

Stinking Hawkweed may be diſcovered, by its very ſtrong ſmell like caſtor. As it is not a common weed, it is not neceſſary to be particular in the deſcription of it.

Muſk-Thiſtle is known, by its handſome purple nodding heads of flowers: which come out rather ſooner than moſt ſorts of Thiſtle. The ſmell of them is agreeable.

Carline-Thiſtle is very different from the other Thiſtles. The hard, woody root, ſends up one round purpliſh ſtalk, beſet with prickly leaves in no order. This is terminated with ſeveral flowers, growing in a head. The ſmall ones, compoſing the whole, are of a duſky purple; and contained in a ſwelling ſcaly cup. The inner ſcales of which are very long, ſhining, coloured, ſpreading, and placed in a ring round the flowers. The ſtalks and heads remain all the year, with very little variation, upon the dry paſtures.

Perennial Weeds in Corn.

Field Fox-tail, *Small baſtard Fox-tail*, or *Mouſe-tail Graſs*, is known by its long, round, ſlender, ſmooth ſpike, of a duſky purple colour. The ſpikes are ſo very long, and ſlender, that they uſually bend a little. This graſs is found in the moiſt furrows of arable land; and in any places, where the water is ſuffered to ſtand.

Common Wheat-graſs, or *Couch-graſs*, is univerſally known, by its long white creeping roots. It grows very tall, eſpecially in hedges. The ſpike reſembles that of wheat, in the manner in which the ſeeds are diſpoſed.

Common

Common field Scabious, is all over rough, and hairy. The ſtalk is upright; a foot, or a foot and a half in height, ſpotted, and branching. The lower leaves are oval, and indented about the edge. Thoſe, which grow on the ſtalk, are divided; and of that ſort, which botaniſts call pinnatifid. The flowers are blue; of the compound kind; conſiſting of a conſiderable number of ſmall flowers: each divided into four parts; and having one ſeed under them. The taſte of the plant is a diſagreeable bitter.

Small Bindweed, called, alſo, With-wind and Hedge-bells: though theſe names ſhould ſeem rather to belong to the great Bindweed; which ramps in the hedges; whereas this overſpreads the arable lands. The common people, in their wrath, have given this pernicious weed the ſame opprobrious names with the Dodder, *viz.* Hell-weed, and Devil's guts.

The ſtalks of this plant are weak; and twine about any thing. They come near, from left to right: and, when they find no ſupport, they trail along the ground. The leaves come out ſingle. They are three cornered, ſhaped ſomewhat like an arrow head, ſmooth, and placed on long foot-ſtalks. From the boſoms of the leaves, comes out one flower, on a very long foot-ſtalk. It is bell-ſhaped, of a beautiful colour, purple, red, white, or variegated: and is ſucceeded by a ſmall, roundiſh ſeed-veſſel, containing four large, angular ſeeds. The whole plant is full of a milky juice.

Bladder-campion, *White-corn Campion*, *Spattling Poppy*, *White Bottle*, *White Ben*, or *Frothy Poppy*. The ſtalks grow a foot and a half, or two feet high, round, ſmooth, jointed, branched towards the top; and, at every joint, is a pair of leaves, perfectly ſmooth. The flowers are white; and conſiſt of five bifid petals. The empalement, or outward covering, is puffed out into a roundiſh form; and is ſmooth, often varied with red, green, and white, and beautifully veined all over like a fine net.

White Campion, admitted into gardens, when it has a double flower, under the name of White Batchelor's-but-

tons. It has a long and large root, of a ſharp bitteriſh taſte, ſending forth ſeveral ſtalks about two feet high; round, hairy, jointed, branching, of a red colour near the ground; a pair of leaves comes out at every joint, hairy, and ſharp-pointed. The flowers are like thoſe of the laſt: but the empalement, which is not puffed out like that, is oblong, with purpliſh ſtreaks down along it from top to bottom.—The flowers of this are imperfect: the male or barren, and the female or fruitful, growing on diſtinct plants.

Small Bramble, or *Dewberry-buſh*, is diſtinguiſhed from the common Bramble of the hedges, by the place of its growth; the trailing of its round branches; the ſmallneſs of its prickles, which are fewer in number, and chiefly on the ſtalks; the leaves growing only three together, being green underneath, and the ſide ones divided into two parts; and the blueneſs of its berries, which conſiſt of a very few large diviſions.

Corn-mint. We are told, on undoubted authority, that this herb will hinder milk from curdling: and that, when hungry cows have been put after harveſt into a field, where this plant abounded, it has been ſcarcely poſſible to turn their milk for cheeſe.

Corn Reſt-harrow, *Reſt-plough*, *Cammock*, *Petty Whin*, or *Ground Furze.* The hard, ſtubborn, creeping roots ſend forth many woody, round, ſlender, hairy branches; red towards the bottom. The leaves grow three together. The flowers are of the pea kind, of a beautiful red colour; and are ſucceeded by a ſwelling, villous pod; containing a few roundiſh ſeeds.

Tree Sowthiſtle. The root is very creeping, full of milk, and with difficulty eradicated. The ſtalk is about two feet high, ſmooth at the bottom, but hairy where it begins to branch out. The leaves are like thoſe of the Dandelion, deeply cut, ending in ſharp points, and having the edges ſet round with tender prickles. The flowers grow ſeveral together; and reſemble thoſe of the Sowthiſtle: but are much larger; of a deeper yellow; and ſurrounded by a very rough, hairy, dark-coloured empalement.

ment. They have the ſmell of bitter almonds; and are ſucceeded by downy ſeeds.

Great Knapweed, *Matfellon*, or *Bulweed*. This plant is about two feet high. The ſtalks are round, ſtreaked, and hoary. The bottom leaves are oblong and undivided: but thoſe, which grow on the ſtalk, are cut and divided. The flowers reſemble thoſe of the Blue-bottles in ſhape; but are of a red colour. The ſeed is ſmall, oblong, reddiſh, and hairy in the upper part.

Corn Horſe-tail grows in moiſt places. In April, naked ſtalks come up, which bear the flower and ſeed. Theſe are but of ſhort duration. In May, other ſtalks ariſe, hollow, jointed, about a foot high; and ſending forth, all round, hollow jointed leaves, ſix or eight inches in length, ſubdividing into others at the joints.

Perennial Weeds in Paſtures.

Devil's-bit is a kind of ſcabious. It differs from the common field ſcabious, in having undivided leaves, ſet thicker on the ſtalk: in the flowers not ſpreading out into a flat ſurface, but growing in a round form; and the ſmall flowers, which compoſe the whole, being all of a ſize and regular: and, laſtly, in the root looking, as if it were bit off at the end.

Great Plantain, or *Waybread*, is eaſily known by its broad leaves, ſpreading on the ground, and marked on the under ſurface with ſeven ſtrong nerves. From the centre of theſe, ariſe ſeveral naked, round, hairy ſtalks; ſuſtaining a long, cylindrical ſpike of ſmall flowers, ſet thick together.

Rib-wort Plantain has much longer leaves, marked only with five nerves. The ſtalks are higher, and not round; but cornered: and the ſpikes of flowers are ſhorter.

Yellow Ladies Bedſtraw, *Cheeſerening*, *Maid's hair*, *Petty Mugwet*. Its ſlender ſtalks riſe to about a foot. The leaves come out in whorls, eight or nine together. They are long, and narrow; and of a deep green. Towards the top of the ſtalk, two little branches uſually come out; ſuſtaining

ſuſtaining a conſiderable number of ſmall yellow flowers; conſiſting of one petal, divided into four parts; and ſucceeded by two ſmooth roundiſh ſeeds.

Round-leaved Bell-flower. The bottom leaves are roundiſh: thoſe upon the ſtalk long, and narrow. The flowers are blue, bell-ſhaped, with the edge divided into five parts, and hang down.

Leſſer Throatwort, or *Canterbury Bells.* The ſtalk is cornered and undivided, about a foot high, and hairy. The flowers grow at the top of the ſtalk, cloſe to it; ſeveral together. They are erect, of a beautiful purple colour, and divided to the middle into five acute ſegments.

Meadow Saxifrage, *Engliſh Saxifrage*, or *Stone-break.* The root has a ſharpiſh, aromatic taſte. The ſtalks are round, ſtreaked, and reddiſh towards the bottom. The leaves are ſmooth, of a dark green, and divided twice into long, narrow, ſharp ſegments. The foot-ſtalks membranaceous at the baſe. The flowers grow in looſe umbels: and are of a pale yellow. The ſeeds are oval, ſtreaked, and red at the top.

Burnet Saxifrage is of two kinds. The larger is found in woods; and the ſmaller, in dry paſtures. Of this laſt, there is a variety, differing only in the leaves, which are cut even to the root. The ſtalks are ſtreaked, and branching. The flowers grow in umbels, cloſe together. They are ſmall, white, and conſiſt of five entire petals. Theſe are ſucceeded by two ſeeds, of an oblong oval form. The root has a very hot taſte.

Crow Garlick, or *Wild Garlick.* The leaves are round, and ſmooth; reſembling much thoſe of ruſhes. From the midſt of theſe riſes a ſtalk, a foot or more in heighth, naked, ſlender, round, ſmooth, and hard; ſuſtaining many purple ſeeds, or little bulbs, about the ſize of grains of wheat, collected into a round head.

White Saxifrage, *Sengreen*, or *Stone-break*, has kidney-ſhaped leaves, ſpread upon the ground, and divided about the edges, not much unlike thoſe of Ground-ivy, but ſofter and ſmaller; and of a faint yellowiſh green. Among theſe,

theſe, riſes a round, hairy, branching ſtalk, about ſix inches high, bearing ſpacious white flowers; conſiſting of five entire petals. This pretty little plant, grows in dry paſtures; and may readily be known by its roots, which are made up of little knobs.

From a want of ſufficient diſtinction in names, a ſtrange confuſion has ariſen between the Meadow Saxifrage, Burnet Saxifrage, Burnet, and White Saxifrage. It is hoped theſe deſcriptions, and figures, will contribute ſomething towards avoiding this confuſion for the future.

Agrimony has generally a ſingle, round, rough ſtalk, with leaves placed alternately upon it; which are winged with ſmall leaves, placed between the larger pairs. The yellow flowers grow alternately along the ſtalk, in a long row, after the manner of a ſpike; and are ſucceeded by rough ſeeds.

Dropwort is known by its winged leaves; the diviſions of which are all regular, and ſharply indented about the edges, by its white flowers; growing in a bunch like an umbel: but, principally, by its roots, which conſiſt of a bunch of knobs hanging upon threads; from whence it has the names of Filipendula, and Dropwort. The flowers ſmell agreeably.

Meadow-ſweet, or *Queen of the Meadows*. The ſtalk is angular, ſmooth, ſtrong, branching, and of a reddiſh colour. The leaves grow alternately, are winged, and conſiſt of three or four pair of lobes, and a very large one at the end, divided into three parts, like a Raſpberry-leaf. They are indented about the edges; white underneath; and wrinkled, like the leaf of the Elm. The flowers are ſimilar to thoſe of the Dropwort. The whole plant has an agreeable ſmell.

Tormentil, or *Septfoil*. The root is large, of a reddiſh colour, and an aſtringent taſte. The ſtalks are weak, and lye on the ground at firſt; but afterwards riſe up. The leaves are hairy; grow cloſe to the ſtalk; and are divided into ſeven parts. The flowers are yellow; and conſiſt of four petals. There is another ſpecies, not ſo common, differing

differing from this only in having its ſtalks lying intirely on the ground; and the leaves growing on foot-ſtalks.

The *Crowfoots* are too common every where, to need a deſcription. They are known under the names of King-kob, King-cup, Gold-cups, Gold-knobs, Butter-cups, and Butter-flowers. The bulboſe Crowfoot is diſtinguiſhed, not only by its round root, but by the diviſions of the flower-cups being bent back; the ſtalk being erect; and that which ſuſtains the flowers being furrowed. The upright Crowfoot has the diviſions of the empalement ſpreading out, as in the creeping ſort: but the flower-ſtalks are not furrowed, as in that, and the bulboſe one. The leaves are divided, firſt, into three parts; and each of thoſe again into ſeveral. The upper leaves are long, narrow, and undivided. This plant grows much taller than the others. The flowers of all three are alike; and of a fine ſhining yellow.

Pilewort, *Figwort*, or *Leſſer Celandine*. The root conſiſts of oblong knobs. The leaves are heart-ſhaped, cornered, and placed on foot-ſtalks. The flowers reſemble in general thoſe of the Crowfoots; but differs ſomewhat from them, in having the cup divided only into three parts: the petals being about eight in number, and narrower. This low plant runs very much at the root, and choaks all plants which are near it.

Bugle, *Middle Conſound*, *Sicklewort*, or *Herb Carpenter*. It riſes about half a foot high, with a ſquare ſtalk. The leaves come out by pairs; of a purpliſh colour; and indented about the edges. The flowers grow in a ſpike; are blue; and have a very ſmall upper lip.

Self-heal, *Hook-heal*, *Sicklewort*, *Carpenter's herb*, or *Prunell*. This differs from Bugle, in the leaves being longer and narrower: and in the flowers growing in a thicker ſpike; their upper lip being larger, and their filaments being forked.

Common yellow Toad-flax, or *Flax-weed*. It creeps very much with its hard woody roots: which ſend up ſeveral ſmooth ſtalks, a foot, or a foot and a half high, covered

with long, narrow leaves, placed without order. The flowers grow in close spikes, on short foot-stalks, at the top of the stalks. They are of a light yellow, shaped like a calf's mouth; and end in a spur behind.

Ladies-smock, *Cuckow-flower*; in Norfolk, *Canterbury-bells*. The stalk is upright, round, and smooth. The leaves are winged, with the lobes of the lower ones roundish; and of those upon the stalk oblong. The flowers are large, handsome, and white, or purplish; consisting of four obtuse veined petals. The seeds are contained in erect, compressed pods, an inch, or an inch and a half long; divided into two cells; which, when ripe, burst with a touch; and throw out their seeds to a considerable distance.

Crow-foot Crane's-bill, or *Blue Crane's-bill*. The leaves are divided, almost to the middle, usually into seven parts. The stalk commonly divides into two branches; and each of these into two more. From the corner of each division, comes a flower-stalk; supporting two large blue flowers; consisting of five roundish, intire petals; succeeded by a long seed-vessel, resembling a crane's-bill. This bill-like seed-vessel is thick and rough; but not so long, as in some of the other sorts.

Rest-harrow, or *Cammock*, of the pastures, differs very little from the Corn Rest-harrow described before. The branches of this are armed with long stiff prickles. The flowers are of a higher purple; and come out single: whereas, in the other, they come out two together.

Dandelion, or *Piss-a-bed*, is well known in all pastures, by its milkiness; and its naked, hollow stalks, supporting one large, yellow, compound flower; which is succeeded by a round ball of downy seeds.

Rough Dandelion, or *Dandelion Hawkweed*. The whole plant is rough, with forked hairs. The flower-cup does not bend back, as in the common Dandelion: and this is a taller plant.

Yellow Devil's-bit; so called, because the end of the root seems as if it were bit off, is also known by the name

of ſmall Hare's Hawkweed. The leaves are ſmooth, long, narrow, and cut into long, ſharp-pointed ſegments. The ſtalks are a foot and a half, or two feet high; and branching. On the tops of theſe, grow many flowers, ſmaller and paler than in the Dandelion; ſupported on ſcaly flower-ſtalks.

Long-rooted Hawkweed. This has a very long tap root. The ſtalks are a foot and a half high, or more; cornered; naked, and divided. The bottom leaves ſpread in a circle on the ground; and are jagged and rough. The flower-ſtalks are ſcaly. The flowers, and down of the ſeed, reſemble thoſe of the Dandelion.

Dwarf, or *Small purple Carline Thiſtle.* This lowly plant ſpreads its prickly leaves a foot round; and ſuffers nothing to grow beneath them. Its purple flower comes out in the midſt of theſe, without any ſtalk, cloſe to the ground.

Colt's-foot, *Folefoot*, *Horſe-hoof*, or *Bull-foot.* In February, the ſcaly ſtalks ariſe, bearing one yellow compound flower; which is ſucceeded by a hairy white down. The leaves come out later. They are ſhaped ſomewhat like a horſe's hoof; and are downy underneath.

Butter-bur, or *Peſtilent-wort*, reſembles Colt's-foot in many reſpects: but the flowers are purple, and grow in a thyrſe. The leaves come out after the flowers decay; and are like thoſe of the Colt's-foot in ſhape; but are three or four times as big.

Ragwort, *Ragweed*, *Staggerwort*, *Stanerwort*, *St. James's wort*, *Seggrum*, or *Seagrim.* The ſtalk is uſually ſingle; round; ſtreaked; ſolid; and of a purpliſh colour, in ſome parts. The leaves are very much jagged, ſmooth, and of a dark green. The flowers are yellow, radiated, and grow many together. See Vol. V. p. 117, *&c.* When I affirmed, that this plant comes up eaſily by hand, when young, or the ground is moiſt; I ſpoke from experience. The fact, in few words, was this. Some cloſes were notoriouſly over-run with this weed. The owner, juſt before the time of flowering, and after ſome rain, turned in a man and woman upon them; ordering the woman, to

pull

pull up all ſhe could by hand; and the man, to root out the reſt, with his docking-iron. The Rag-wort was not, indeed, left in a lane, for the downy ſeeds to ripen; and to be carried on again to the cloſes, by the wind: but the plant was thrown in heaps; and burnt; and the aſhes were ſpread upon the graſs. It was not, indeed, all deſtroyed at this firſt attempt; but the few plants, which came up, the following year, were ſoon pulled up by the woman; and ſcarce a plant has now appeared in theſe cloſes, for ſeveral years paſt.

Fleabane, *Middle Fleabane*, or *Fleawort*. The ſtalk is round, bending, ſolid, and hoary. The leaves are oblong, ſharp-pointed, wrinkled, downy, and embrace the ſtalk, on which they grow, very thick, without regularity. The flowers are yellow, radiated, and incloſed in a flower-cup, made up of narrow ſcales like briſtles. Mr. Ray tells us, that, if the leaves or tops of Fleabane be ſqueezed, they ſmell like ſoap. Gerard ſays, the herb-women call it Herb Chriſtopher.

Greater Daiſie, *Ox-eye*, or *Maudlin-wort*. The ſtalk is five-cornered, ſolid, and branching. The leaves are jagged; and embrace the ſtalk. The flowers are large, and radiated. The ray is white; and the diſk yellow: the ſeeds have no down.

Common Yarrow, *Milfoil*, or *Noſebleed*. The ſtalks are ſlender, round, ſtreaked, ſtiff, and hairy. They are divided towards the top into ſeveral branches; and theſe again into flower-ſtalks; ſupporting ſmall white or purpliſh flowers; growing thick together in a kind of umbel. The leaves are cut very fine; and divide twice.

Common, or *Black Knapweed*, *Matfellon*, *Black Matfellon*, or *Bulweed*. The root is hard, thick, and woody; and has a diſagreeable aſtringency. The ſtalks are round, rough, ſtreaked, ſtrong, and very tough. The leaves are irregularly placed, oblong, and of a dark green. From the wings of the leaves, ariſe ſtalks, ſupporting one, two, or three heads of flowers; which are purple; and incloſed in a ſcaly cup. The ſcales are black, and ſurrounded with fine hairs, like the eye-laſhes.

The *Orchiſes* may be known by their roots; which are either a double bulb, reſembling a pair of teſticles; or a bunch of long fleſhy roots, like the fingers of the hand. The flowers, by growing in a ſpike, make a handſome appearance. The colour is red in moſt ſorts.

Adder's-tongue, is hid among the graſs in low meadows. From a very low ſtalk, ariſes a ſingle, thick, ſmooth, oblong leaf; from the boſom of which, iſſues a kind of tongue, ending in a point, and indented on each ſide like a file.

Thus have I finiſhed my intended deſcriptions. If I can be of any farther ſervice in this buſineſs; or any other relative to agriculture; I ſhall, at any time, readily employ a vacant hour in ſo good a work. Give me leave to remark, in anſwer to Mr. Comber, that when I put Heart-trefoil among weeds, I did not mean, that it was an uſeleſs plant; but that, in my opinion, it was inferior to the other kinds of Trefoils. It will not be thought, I hope, that all the plants, which are inſerted in my liſt, are abſolutely uſeleſs, and injurious; but that they are ſo, only becauſe they are out of their place, or occupy the room of better things. If I ſend you, as I intend to do, when I have leiſure, an account of our Engliſh plants, which are moſt uſeful in the various purpoſes of life, you will find many of thoſe, which have before appeared in the liſt of weeds, come forth again in a more reputable form.

You have, with this packet, a ſpecimen of the *Strawberry Trefoil*; which you may make what uſe of you think beſt. It is a plant, that propagates itſelf very faſt in its natural ſtate, by its creeping ſtalks, which take root at every joint. The leaves come out from a large bifid membrane. They are ſmall, and placed on a long, hairy foot-ſtalk; and ſlightly indented round the edge. The round heads of flowers come out ſingle, on a long ſtalk, from the membranes; and conſiſt of ſmall, pale red flowers. When theſe decay, the flower-cups ſwell out into rough bladders; which bend down, and are divided into two horns,

horns, at the end; each bladder has within it, a ſmall pod, containing one ſeed. It flowers late, in July or Auguſt, and is common in paſtures where the water has ſtagnated during the winter.

I cannot ſubſcribe to the opinion of *Ruricola Gloceſtris*, concerning the fatal effects of Ground-ivy upon horſes. This herb has been uſed, time out of mind, for a variety of diſorders, incident to the human body: and, in many, with very good ſucceſs. As, therefore, I can find no ill qualities attributed to it, by any writer; nor any internal marks in the plant itſelf, to perſuade me, that it is at all noxious, I muſt ſuppoſe, the death of the horſes to be owing to ſome other cauſe, till more convincing proof be brought. It is, however, an uſeful caution; and, I hope, will be farther attended to: as fact will ever be better than reaſoning.

The Orchard-graſs, mentioned by *Civicus*, Vol. V. p. 45. is the Dactylis Glomeratus, of Linnæus, Rough Cock's-foot Graſs, or Rough Graſs. It is a tall, and very coarſe graſs. The ſtalk and leaves very rough, and the head thick, heavy, and growing wholly on one ſide of the ſtalk: but it is well repreſented in Plate I. Fig. 5.—There is a variety of this, not unfrequent about London; which is leſs harſh, with narrower and ſmoother leaves; and the ſpike at the top longer, and more ſlender. Perhaps, this may be the graſs which Civicus recommends.

In anſwer to Mr. *Comber*'s queſtion, Vol. V. page 63, whether the *wild* Saintfoin differs from the *cultivated*; I anſwer, not at all, unleſs in being ſmaller. Old Gerard takes notice of its growing wild about Cambridge; and upon Barton-hill in Bedfordſhire. It is very common in England on balks; and particularly in chalky paſtures: and is, by no means, a ſtarved plant with us, in its wild ſtate.

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